ARCHITECTURE DEPARTMENT **CHINESE UNIVERSITY OF HONG KONG**

MASTER OF ARCHITECTURE PROGRAMME 2001-2002 DESIGN REPORT

PROGRAMMATIC HYBRIDITY

CHAN King Ming April 2002

Design Progress

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2. Programs defined
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   - Case Study
   - Technical Study
4. Sketches
   - Water Sport Transformation
   - Combinations
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6. 1st Proposal of Combination
7. Logic of Combination
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Topic Defined

PROGRAMMATIC HYBRIDITY


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1. Topic Defined

Programmatic Hybridity

Hybridity, as a genetic concept, can be traced back to Aristotle and his sophistic conjectures upon the origin of certain animal species as the result of crossbreeding. For a biological term, the offspring from crossbreeding will take the advantages from both sides of the parents.

There are lots of hybrid buildings in the city which are just putting different functions and programs under one roof. This should not be the end of the hybrid architecture. The concept of programmatic hybridity is introduced that the "offspring" will take the "gene" from both sides of the parents and mixing the programs to form a new program.

The programs chosen for this thesis are water sports and urban entertainment. Water sport is known as the activity that take up lot of space and the relied on the natural water resourse, it usually happens in remote coastal area. It seems to be impossible to play in the middle of the city.

To help water sports happen in the city, the way of playing it should be altered and mixed with other programs to make it popular and economical balanced. The urban entertainment like shopping, dining, live performance and movie are used to mixed.

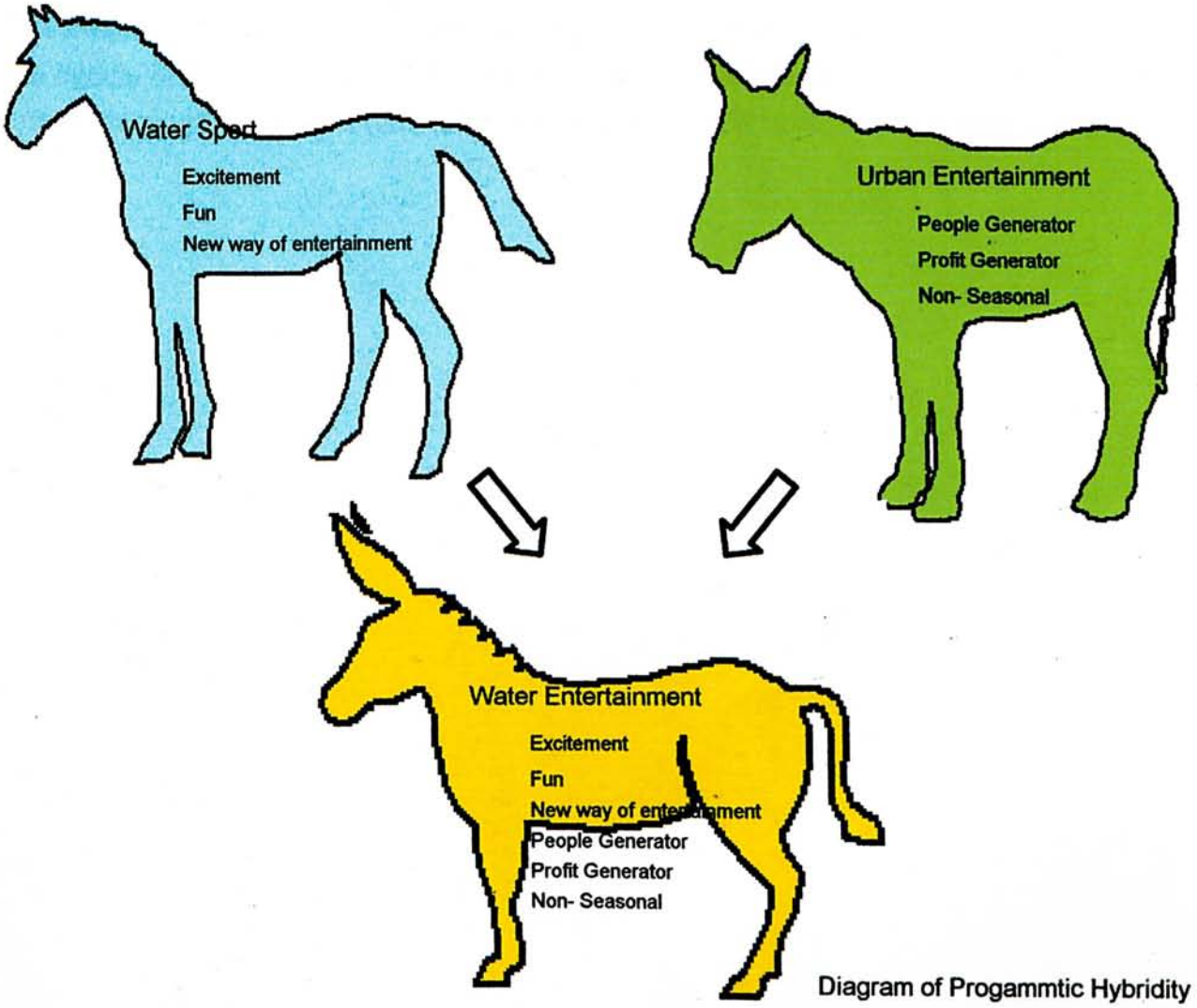


Diagram of Progammtic Hybridity

2. Programs Defined

For this thesis, the selection of the programs is very important.
As the programs choosen to hybrid with water sport should provide benifit for water sport to make it can survive in the middle city.

The program choosen for this thesis is urban entertainment, which is already being in the middle of the city. It make sure that this gene can survive in this area. And also it is known as prople and profit generator, which gives a new perspective to both activities.

Programming

Water sports
Selected in terms of space required and feasibility.

Swimming
Swimming pool, swimming track
Canoeing
Canoeing track, whitewater canoeing track, equipment storage
Wind Surfing
Track or pool, natural wind inlet and outlet or wind simulator, equipment storage
Surfing
High speed water current generator, "curve board" device, equipment storage
Water Skiing
Wave generator, high speed water current generator, equipment storage
Snorkeling
Snorkeling pool
Scuba Diving
Diving tank, equipment storage

Urban Entertainment
Selected in terms of the extent of alternation when combinated with water sports

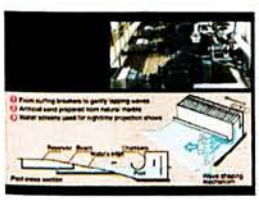
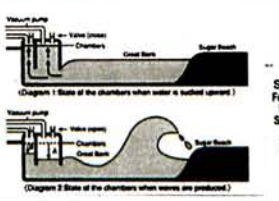
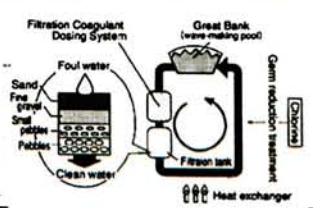
Shopping
Eating Place
Food stalls, kitchen, seating area, food court
Waiting Plaza
Film Appreciation
Screen, projector, seating, ticket office
Performance Stage
Stage, eqiupment
Dancing Floor

Other Requirement
Carpark
Circulation
Special Requirement
- Water pumping system
- Reservoir
- Water purifying system
- Water warming/ cooling system

Changing Room
- Shower
- Lockers
- Changing place
- Equipment washing place

Reception



3. Research

A. Precedent Study
B. Case Study
C. Technical Study

A. Precedent Study

Precedent study

The ways of mixing activities:

Paseo del Rio, San Antonio, Texas

It is a leisure and landscaped river corridor for sight-seeing, dining, socializing, listening to music. It is a redevelopment to bring the restaurants, outdoor seating and some outdoor performance stage.

West Edmonton Mall, Canada

It is the largest shopping centre in the world which contains 800 stores and over 110 eating establishments. It is not only a large shopping mall, but also an indoor amusement park including water park, ice arena, submarines, man-made lake, dolphin shows, golf course, movie theatre and casino.

The way to due with large volume of water

Baltimore Aquarium

It is not essential to have a all the way up transparent glass wall for the propose of watching fish. As high pressure of large water tank, it is difficult to have a large surface of glass, it usually just some opening of a structural wall. And also the glass part is usually in curve to resist the great pressure.

The ways that make water sports happened artificially

Areal Vodnych Canoeing Club

It is a place to play whit water canoeing. It makes two canals with turning and blocks to simulate the natural river. For the problem of level, it use a inclined lift for canoes.

Extreme games

In a TV sports games program, there is a device that projecting high speed water onto a curved board that a big wave for surfing can be produced. It takes very little space and little volume of water.

Nagashima Flow Rider, Japan

It is a artificial surfing centre which consists of a series of cured plastic waterways.

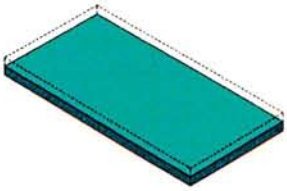
B. Case Study

Case study of each activity

As this is a hybrid project of water sports and urban entertainment, to start designing something new, we should start by looking at the existing condition of each activity.
This study is to list out all the water sports and urban entertainment that can be possible to put in and point out the basic requirement of each activity. For the water sports, a summary of the water surface area, water depth and the air space above water is also produced.

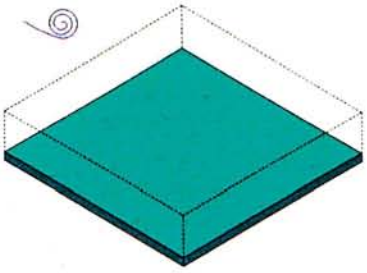
Water Sport

Swimming

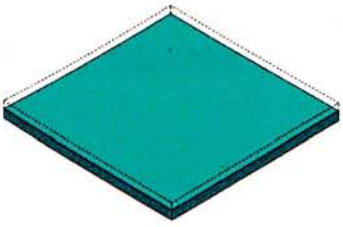


Surfing

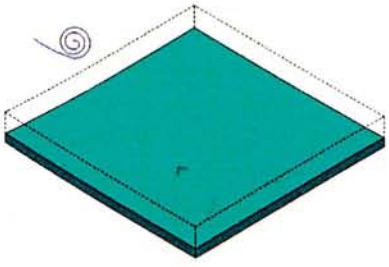
Kite-board Surfing



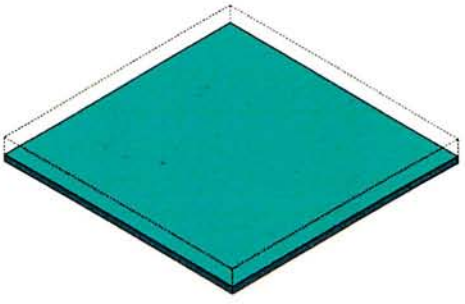
Canoeing



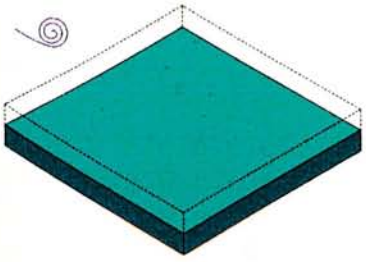
Winf Surfing



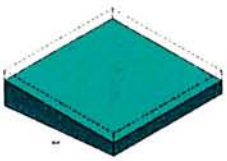
Water-skiing



Sailing



Snorkeling



Scuba Diving

Urban Entertainment

Shopping

Waiting plaza

Eating Place

Film Appreciation

Aquarium
Exhibition
Performance Stage

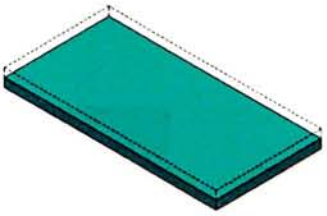
Gymnasium
Dancing Floor
Karaoke

Case Study
Water Sports (Selected)

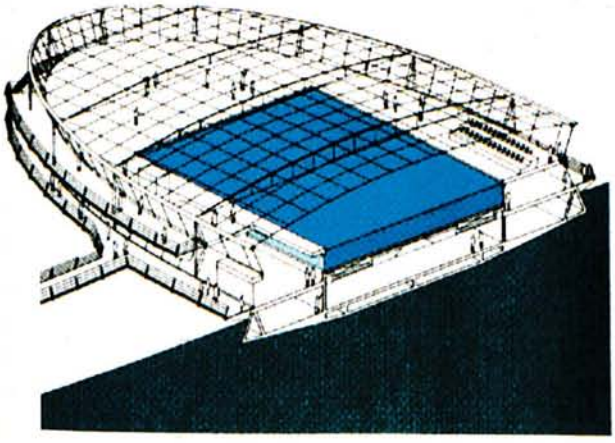
Swimming

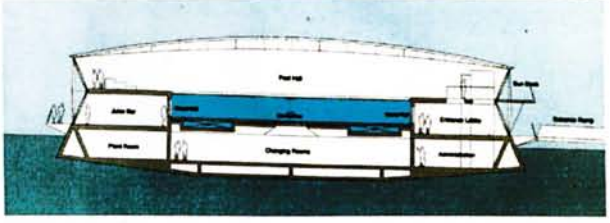
Case Study: London Lido
Requirement:

Swimming is the most popular water sport in Hong Kong. There are many indoor and outdoor public swimming pools built in almost all districts. The success of it is the translation of beach swimming into a more clean and convenient swimming environment. For the urban water sport centre, I will also try to get the essence of this translation.



Item	Requirement
Depth of water	From 1m to 2m
Surface of water	Surface depended. But in swimming pool the path is folded into swimming line.
Wind	Not wind depended
Height of air above water	2m, enough room to let person to get into the water.
Storage	Normal lockers needed.

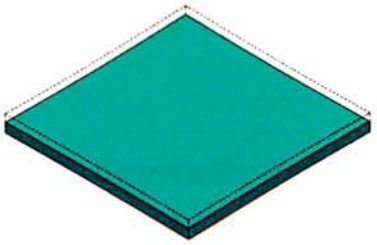




sectional isometric

Since swimming is slow compared with other water sports and the repeat route in pool swimming, it is good to have something to see while swimming. On the other hand, it is also good for others, non swimmers, to have a look of the swimming, just like a men aquarium. To achieve this, a transparent or partly transparent swimming pools together with carefully arrangement of surrounding activities.
And also in the case study, the changing rooms are situated below the main pool which can be done structurally . Another point is the mix of activities, in this case, the swimming activity is mixed with food with seating towards the swimming pool.

Canoeing



Case study: Jockey Club Wong Sek Water Sport Centre

Requirement:

Item	Requirement
Depth of water	2.5m - for capsize)
Surface of water	1m at the landing place
	Surface depended
Wind	Can be resolved into tracks
	Not wind depended
Height of air above water	2m
Storage	Canoes stored in horizontal way in racks height up to 1.8m.
	Paddles usually in vertical way of storage

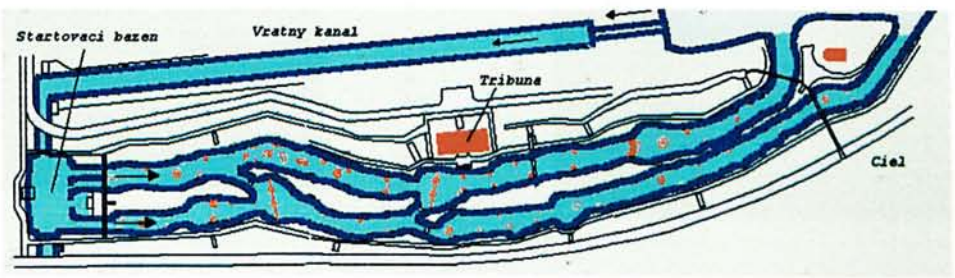
Canoeing is good fit in urban site as it is not wind depended and also for whitewater canoeing, it can be fit in vertical situation. And also there is no time for boat waking, and easy for storage.

For teaching canoeing, the coach is usually using canoe also. So no motor rescue boat needed. And for the lecture, some lecture room should be provided.

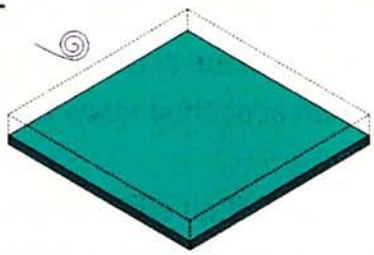
Canoeing

Case Study: Areal Vodnych Canoeing Club

In this case, the canoeing is doing in form of tracks. There are two tracks with carefully set of waterfall and turning. The whole track of canoeing is inclined, there is canoe lift for people no need to get off of the canoe to start again.
For this kind of setting, it can be fit in vertical situation as the route can be folded.
For whitewater canoeing, it gives the surroundings more energy, in terms of motion and sound. But the depth of water for whitewater canoeing should be much deeper.



Wind Surfing



Case study: Jockey Club Wong Sek Water Sport Centre

Requirement:

Item	Requirement
Depth of water	2m – more than height of person – for person falling into the water <1m at the landing place
Surface of water	Surface depended As the speed of wind surfing is quite high, it needs large surface of water
Wind	Wind depended Wind level 1-3 is most suitable
Height of air above water	5m
Storage	The surfing boards are stored in horizontal way in racks height up to 1.8m. The main is rolled up and stored in horizontal way The boom is stored separately and hanging next to the rack.

Wind surfing is wind depended and as its high speed, large surface area is needed. For wind it can be simulated by wind simulator but the large horizontal water surface is hard to translated into a vertical way or a folded way.
Waking up the boat is another problem. It is quite time consuming to wake up the boat. It can be improved by store he boat in a "semi-waken" way that the board is detached and stored in racks and the mast and the waken main and boom is stored vertically.
For teaching, lecture room is needed for beginning and evaluation. And also "simulator" should be placed for on land demonstration.
As the sliminess of the surfing board, the landing place can be small.

Case 2: Cheung Chau Water Sport Centre

This is a private water sport centre which mainly for wind surfing. As it is a private centre, a café is sit just next to the centre for the users of the centre and also to provide a good sea view restaurant for tourists. The café is wide open to outside, with the decoration, the rope and surfing board table, it has the theme of a water sport centre café.

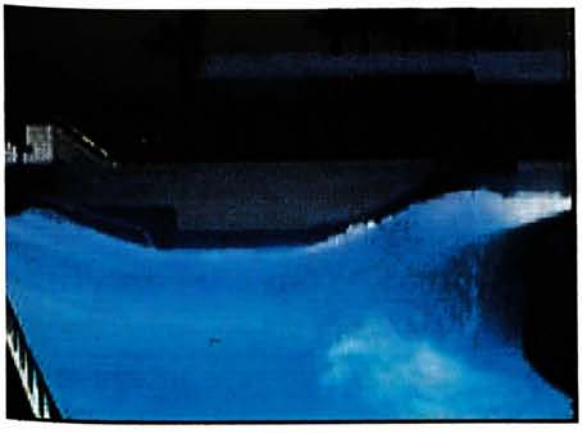
Surfing

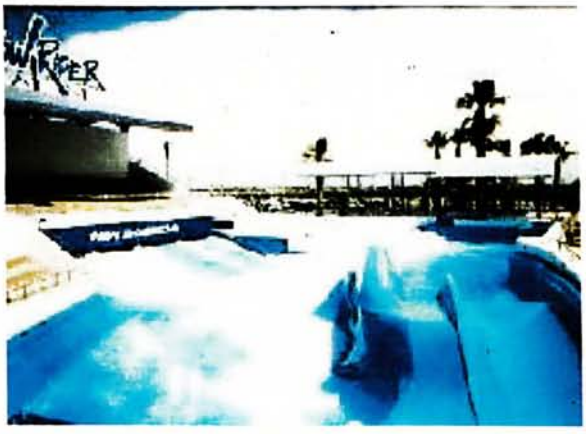
Requirement:

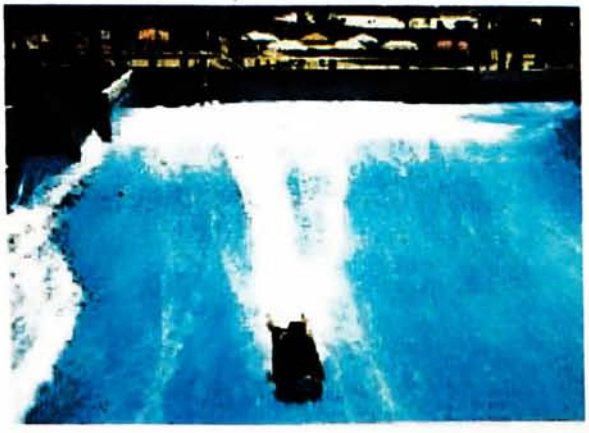
Item	Requirement
Depth of water	Can be only a sheet of water in high speed, but the height of the "wave" can be up to 2m.
Surface of water	Not surface depended. If the speed of water is high enough, the surfing board is in dynamic equilibrium.
Wind	Not wind depended
Height of air above water	2m- a person height
Storage	The surfing boards are stored in horizontal way in racks height up to 1.8m.

Case study: Nagashima Flow Rider

It is a centre to provide wake board surfing by artificial wave. The different wave situation are provided by hitting constant speed of water onto different curvature. In order to give out the most usual wave situations, a wide range of glass fiber curvatures is provided together with multi-directional water ejection.

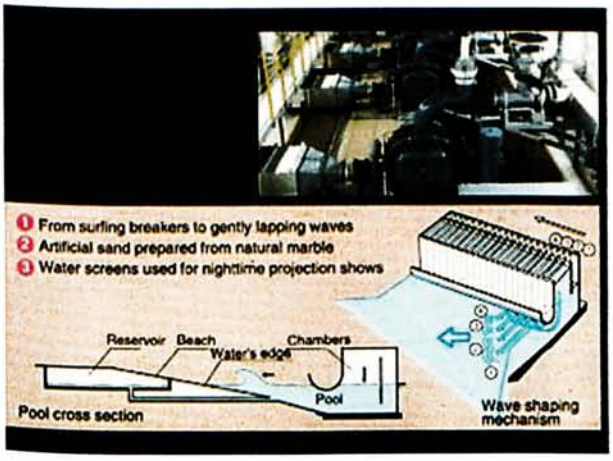


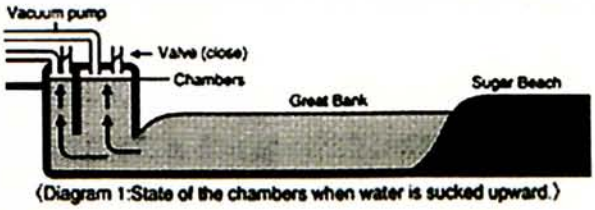




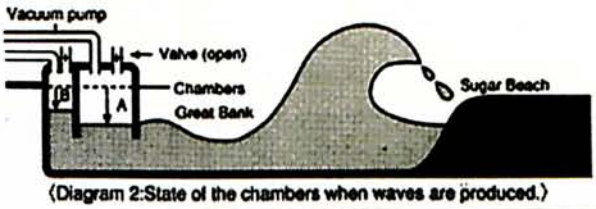
Surfing

Case study: Ocean Dome





(Diagram 1:State of the chambers when water is sucked upward.)

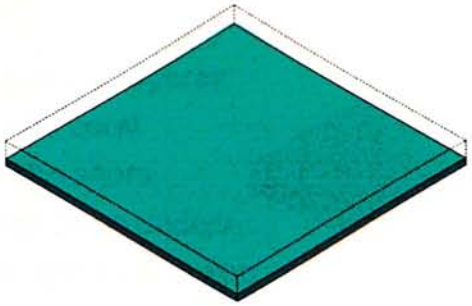


(Diagram 2:State of the chambers when waves are produced.)

In this case, the way to produce the wave is different from the one in Nagashima Flow Rider. it is by a computer-controlled multi-vacuum chambers which generate waves exactly like those in the ocean itself. Waves from ripples to billows 2.5m high are produced by the world's largest wave-making system. The opening of each wave chamber is 70m wide. The waves are in different height and different frequency as it will be too artificial for surfing.

As surfing can be done in no wind situation and also the volume of water can be very small, only a sheet of water in high speed, it can be fit in urban building quite easily. And also in Hong Kong, there is no suitable location with such high wave for surfing until typhoon comes, this gives chance for people to play it safely.

Water Skiing

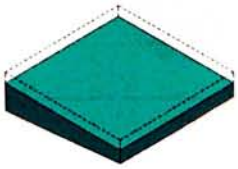


Requirement:

Item	Requirement
Depth of water	2m, for player can totally immersed in the water to slow down the speed.
Surface of water	Surface depended. As it is driven by speed boat, it needs very large area of water
Wind	Not wind depended
Height of air above water	5m, there is jumping motion
Storage	There are three types: one-board, two-boards and bare foot. The boards are easily stored in racks. And another equipment is the speed boat which give the driven power to the player.

For normal water skiing, it needs large water surface for the speedboat to go around. And also the space to store the speedboat should be large. As these reasons, dramatic modification should be done in order to fit the water skiing into an urban context. This can be done by similar to the modification of kite-board skiing, the driven force changed into artificial generator.
As it does not depend on wind force, it is easier to modify to fit in small area.

Snorkeling



Snorkellers who don't want to be tied down by a 'guide' or tour operatc on a boat which drags you out to open sea to see fish and coral. Snorkellers who would rather go underwater right from the shore. Snorkellers who want to go whenever they have the urge to be underw ter and stay for as long, or as short, a time as they like. Snorkellers who like to float effortlessly, then drop down quickly to get a closer look.

And also the equipment for snorkeling is much more simple than scuba diving. But as this reason, the depth of water that dive in is limited.

Requirement:

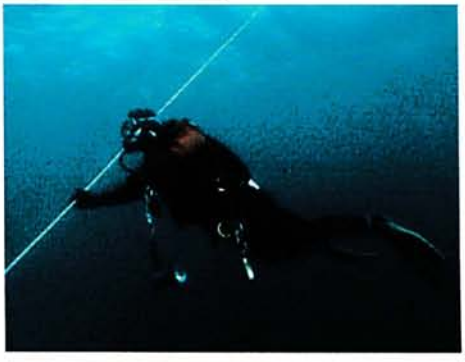
Item	Requirement
Depth of water	Can be shallow up to 1m, depends on the creature distribution. It should be varied and in some part it can be dived down to have a closer look.
Surface of water	Surface depended. As it is slower than swimming, the water surface used will be as large as sailing or wind surfing.
Wind	Not wind depended
Height of air above water	2m, enough room to let person to get into the water.
Storage	The equipment for snorkeling is very simple, wet suit, snorkel and goggles. They are stored in some locker or taken by the players.

It can be fit for the urban centre as it is slow and not quite water surface depended and also the players are not playing in 2-dimension, they can go horizontally and also sometime vertically. And also because of its simple equipment, it fits the busy life in city. Inside water, it is not same as the water sports on the water surface, the cool and silent environment gives a cool down, noncompetitive world for the city life.

Scuba Diving

Requirement:

Item	Requirement
Depth of water	Theoretically unlimited For open diving license, 18m is max.
Surface of water	Not surface depended. But for the getting out water surface cannot be mixed with other water sport like sailing for safety reason.
Wind	Not wind depended
Height of air above water	2m, enough room to let person to get into the water.
Storage	There are lot of equipment for scuba diving, wet suit, weight belt, scuba, goggles, mainly of them is rented from the equipment shop together with the rental of taxi boat.

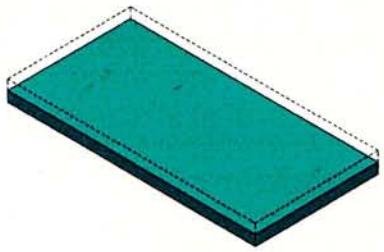


The depth of the water for diving is theoretically unlimited but for those who get the license for open water diving is limited to 18m. Similar situation to snorkeling, it breaks the playing dimension from 2D to 3D, and the difference from snorkeling is the playing volume in a more vertical way.

In normal diving in the sea, the aim is to appreciate the nature, the crystal clear water, fish, coral, but in the urban centre, it will become appreciation of the city. As diving is free "walking" inside the water, it can give a new perspective to appreciate the city.

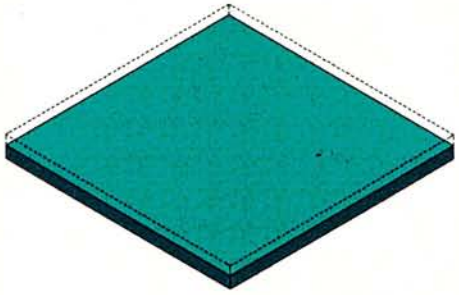
Water Sport Spatial Requirement Summary

Swimming

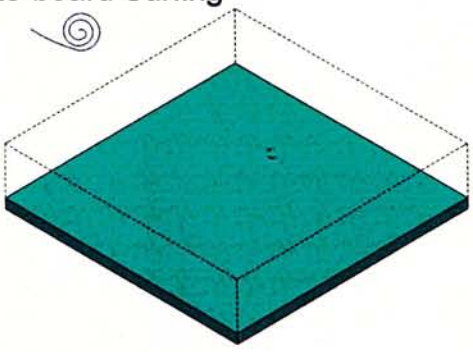


Surfing

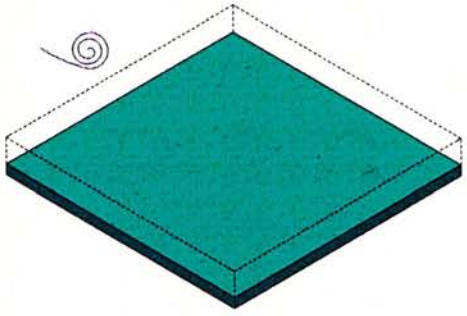
Canoeing



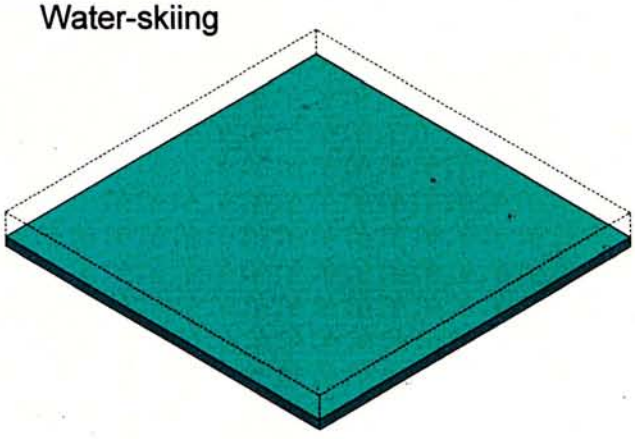
Kite-board Surfing



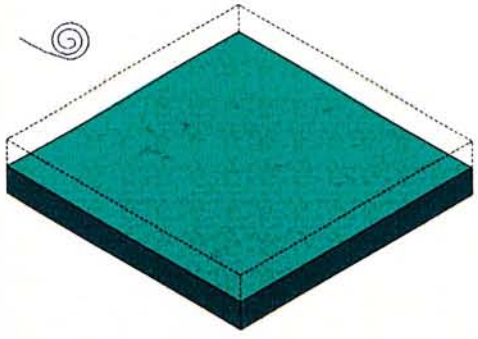
Winf Surfing



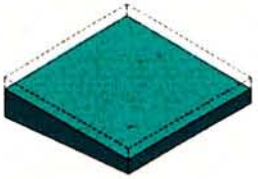
Water-skiing



Sailing



Snorkeling



Scuba Diving

Case Study
Urban Entertainment (Selected)

Shopping

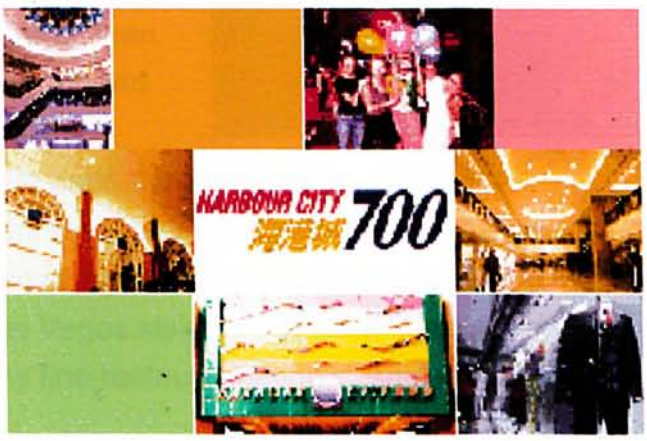
Aim

Some people like to spend money, they will not care when and where they can use that goods.
Most of the people are just killing time and shopping centre got air conditioned environment with lots of people to watch.
Some shoppers have already got the target to buy.

Target group:
Nearly all people will go shopping.
There are shopping centre that group the stores that selling similar goods together, e.g. Golden Computer Shopping Centre. This will attract only the one who are interested in it to go shopping there.
Another type of shopping is a mixed goods. It happens in most of the shopping centres which provide a mixed of variety of shops inside a single centre with strata them into different levels. Street shopping is also in this type. And for this type of shopping environment, a large variety of people will go there, e.g. men will go for hi-fi but ladies will go for fashion.

Spatial requirement

For shopping space, the spatial organisation is the relationship between the shops and the circulation. A good shopping environmentl provides a comfortable circulation for the shoppers to flow and the main issue is to attract people to consume.
Another key requirement is the location. Location with many people flow and connected to mass transition will be better.



Case study

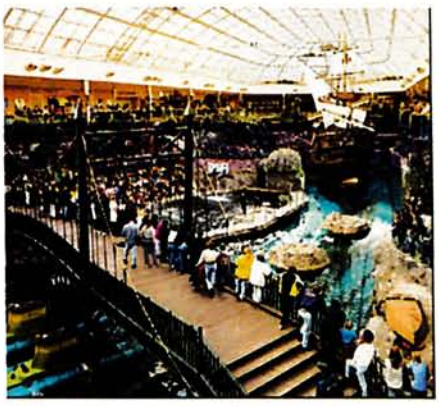
Shopping in Hong Kong is mainly divided into two types, one is street shopping and the other type is mall shopping.

Street shopping- Mongkok

Mongkok is the busiest shopping area in Hong Kong. There is a mixed of variety of goods which distributed in a few street near MTR station. And together with a lot of shopping centres around, it becomes a key shopping area for nearly everything. And for the street shopping, some streets got mixed goods ,e.g. Tung Choi Street (Lady Street) and Sai Yeung Choi Street, which selling goods ranged from clothes to mobile phone. And some streets are selling particular goods, e.g. Fa Yuen Street is for sport shoes. And also in street shopping, food stalls also take up lots of shops. They usually sell snack, e.g. fish ball.

For most part of Mongkok, the building height is usually 8-10 storeys and the width of pedestrain walkway is 2.5m and there is vehicle road in between with width of 6m. This scale of setting is good for shopping as the buildings sounding are not too high to block the lighting and trap the heat. And for the old buildings like that, the ground and some first floor are shops and also no first level direct footbridge and connection among the shopping centre, all circulation is depended on street level.

Shopping mall – West Edmonton Mall in Canada



It is the largest shopping centre in the world. West Edmonton Mall features over 800 stores and services, over 110 eating establishments, plus seven World Class Attractions. It's the only mall of its kind - both a shopper's dream and a world of excitement and adventure. Open 365 days a year, millions of visitors come from around the world to visit this outstanding destination, which features the world's largest indoor amusement park, the world's largest indoor waterpark, an NHL-size ice arena, four seaworthy submarines in the world's largest indoor man-made lake, dolphin shows, an exact replica of the Santa Maria ship, a miniature golf course, 26 movie theatres and a Las Vegas style casino. With the Fantasyland Hotel and the West Edmonton Mall Inn, many fine restaurants and nightlife, the mall is a vacation resort in itself.

It breaks the boundary of being just a shopping mall, a lots of functions are added. The shopping malls in Hong Kong are similar but different in extent. In Hong Kong, some malls also contain cinemas and ice skating court.

Waiting Plaza

Aim

A place that easy to find and gather. And also facilities support people for waiting.

Target group

All people

Spatial requirement

First of all it is connected to public transportation, place near or inside MTR station is very popular waiting place.
Something easy to recognized. E.g. the Hang Seng Bank in MTR station, the 5 flag posts in tsim sha tsui star ferry pier.
Some support facilities that helps effective communication such as telephone boxes.
And facilities for killing time while the one is late, e.g. the large screen in the external of Ocean City, the café around the waiting plaza in Tung Chung shopping centre.

Case study

Street Level Plaza in Time Square, Causeway Bay
In this case, there is a large plaza in the street level of the shopping mall. As it is a few storeys high covered plaza by the building itself, it can be free from raining. As it is large, it can contain lots of people at the same time. There is a large screen on the external wall of the plaza to show some advertisement and cable TV. It is connected to MTR station is another reason.

Eating Place

Aim

To have meal
To have place for gathering

Target Group

All people

Spatial requirement

Space for a restaurant depends on the type of food selling. But there are some basic requirements for a restaurant. For a restaurant, there should be kitchen. Usually kitchen will take up about 30% of the total floor area of the restaurant. Water supply, electric supply and towngas supply should also present in kitchen area. There should be floor drain and sewage water pipe. Inside kitchen, there should be washing area, food preparation area, fridge and cooking area. Beside kitchen, there should be toilets, it can be allocated one shared by other restaurants.

Since restaurants are not only place for eating, but also for gathering, scenery is also very important. Not only the view from inside to outside but also important for the restaurant to have view from outside to inside for better promotion.

Usually restaurants would get their own theme. Some got a clear theme of the restaurants e.g. Rain Forest. But for others, at least the type of cusine selling will become the theme, e.g. we can easily distinct a Thai restaurant.

Food court type of eating place is now very common in most of the shopping centre. They share the seating area, toilets and the cleaning staff. The success of food court is that you can try out different food within the same place.

Food stall is another kind of eating environment. Snack type of food is selling.

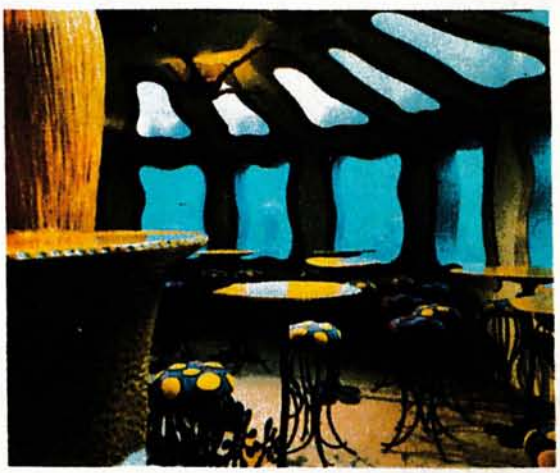
Eating Place

Case Study

Sea view – Cheung Chau Island promenade

It is a promenade near the Cheung Chau ferry pier. This promenade is a pedestrian way with shops and restaurants in one side of it. As to enjoy the sea view, the tables are all placed outside of the shops, on the other side of the street near the water, that means waiters should pass across the road to reach the customers. The customers there enjoy not only the sea view but also the view towards the street which has a lot of people passing.

Inside water –The Red Sea Star Underwater Restaurant, Eilat, Israel 1999
Submerged 20 feet below sea level and 300 feet offshore at the bottom of Eilat bay, it is the first underwater gourmet centre. It is important to know that the interior of the restaurant is sculptured as oceanic scene. In the past, there are also restaurants having similar concept of being inside the water but the usual way of doing it is to place a large aquarium inside the restaurant but in this case the restaurant is submerged into the water, all the oceanic scene is real. This concept can be used in the water sport centre, as there are people diving or swimming, it can become part of the scene of the restaurant and also the divers have got something to see.



Film Appreciation

Aim

For relaxation, they can take a break with seat for 90 mins
For killing time, movie takes time
For particular use of the movie, e.g. knowing different culture by movies

Target Group

All people, no matter how many to go, they also treated as single.

Spatial requirement

The requirement of a theatre can be as simple as a screen with a few chairs.
For the screen, there are some options of it. The most common one is the projection screen, white in color, and together with a projector. Other type can also be found, e.g. water curtain screen, or just a blank wall.
For the theatre, a dimming system should be present in order to be bright while coming and getting out of the theatre and dark enough for watching movie. And also acoustic issue should also bear in mind. There is a rule for the size of the screen and the distance of viewers from the screen.
As in the theatre, the screen should be the only thing that can be seen, there can no view, no window, no sound. Watching movie is an isolated and also a self centered activity. View may be provided for the viewer which no concerning about the movie just have something to see to kill the time. Another suggestion is to have movie watching both in seats in the theatre and also the people diving inside the water.

Case Study

Disney water curtain theatre
Disney favorites such as Sorcerer Mickey in his famous "Fantasia" scene, and characters from "The Lion King" and "The Little Mermaid", to name a few, projected onto giant water curtains. Together with fire work and drama on stage, it carries visitors to a dream world.
In this case, water curtain as the screen is used. Which may also be used in this project to reflect the multi-status property of water.

Performance stage

Aim

A place for the public to appreciate all kind of music
For musicians to exchange experience.
For the landlord, this activity attracts more people to comsume there.

Target Group

Music-lovers

Spatial requirement

A little stage with all the equipment needed ,e.g. amplifier, speakers.
It can be indoor and outdoor but outdoor music performance gives a feeling of playing in a freedom way.
It can be mixed with other activities, e.g. waiting place or the outdoor seating of restaurant.

Case Study

Friday music performance in Quarry Bay
It is a every Friday event from 5:30pm to 7:30pm. A part of the Tong Chong street will be closed to become pedestrian path. A temporary stage will be built, with full set of equipment, a few bands will perform, usually jazz. The band is invited and supported by the landlord there in order to increase the income of the bars on the side of the road. Outdoor seating is provided. Lots of people from the office around will come to have happy hour there.

Dancing floor

Aim

Dance-lovers will love to dance there
Group activity that friends will go together
Treat it as a kind of sport and get training of it

Target Group

All people. Aged people will also organise party to dance. Most of the youngsters will go to disco to dance. Kids will go to the learning centre to learn ballet.

Spatial requirement

A large non-slipery dance floor, a stage with band and equipment, suitable lighting (flashing when rock) and bar and seating area are the most essential part of the dancing place. It can be indoor or outdoor, but because of the noise, it usually indoor.

Case Study

Queen' s Disco in Central

It is a totally enclosed place with no external factors that can affect the inner environment of the disco. After entering it, the environment is totally different. It is done by dark corridor and staircase with heavy music. This kind of mood changing can also be used as the busy life in the city can be changed into a quiet and slow water world.

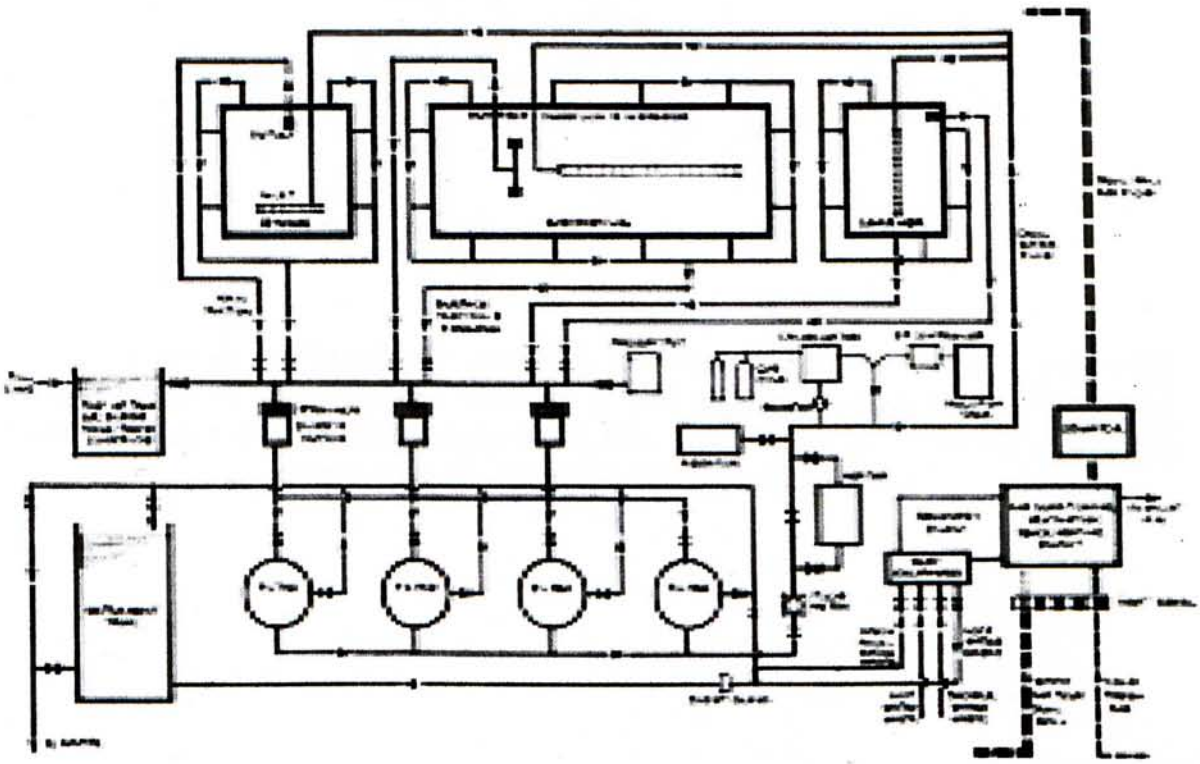
C. Technical Study

General Considerations of Water Treatment System

1. For outdoor swimming pools, it is preferably to receive sunlight in the afternoon.
2. Avoid large trees around the pool. Reason: leaves, shadow, root.
3. Make use of existing wind breaking items.
4. For training pool, fraction of 100m and rectangular.
5. Minimum size of swimming pool : 5m X 10m X1m deep.
6. For calculating the load of pool: $2m^2$/ person.
7. Condensation problem of swimming pool can be solved by heating and ventilation.
8. Swimming pool and main building should be separated as smell of chlorine and the high humidity will damage the structure.
9. Access to the pool is important. For not close to public transport should provide parking area.
10. Minimum depth of pool:
    Competitive pool = 1.8m
    Life-saving certificate = 2m
    Swimming only pool = 1.5m
    10m Diving pool = 4.5m
11. Gradient: pool floor = 1:30, wet area = 1:40.
12. Changing room and sanitary for swimmers is recommended in the same level as the pool.
13. Pool facilities are provided for the benefit and enjoyment of the public.
14. Pre-cleansing area: showers and foot baths.
15. Size of changing cubicle = 1m X 1m.
16. For normal swimming pool: 1 changing place/ $6.5m^2$ pool area.
17. Pool load => turnover period.
18. Calculation of sanitary accommodation:
    Max number of swimmers + 30% extra
    Assuming 40% female and 60% male
    Female: n<90, 1 WC/ 30 persons
    n>90, 1 WC extra/ 40 persons
    1WC = 1 WHB
    Male: n>100, 1 WC/ 50 persons
    n<100, 1 WC extra/ 75 persons
    min 4U, 1U extra/ 30 persons
19. First aid room is provided.
20. Separated room for chlorinator and cylinder
21. Room for chemical feeding equipment
22. Quick drying room: Hot air drying the body. Warm benches and radiant heating panel on the wall, 50-55℃

Water Treatment requirement

1. Pipework for water circulation, supply and drainage
2. Strainer
3. Electrically-driven centrifugal pump
4. Filters
5. Means of continuously disinfecting the water
6. Electrical installation
7. Plant room for items (1)- (6)
8. Coagulant dosing apparatus
9. Alkali dosing apparatus
10. Automatic residual chlorine (or other disinfecting chemicals) and pH controller
11. Chlorine cylinder storage
12. Store for chemical in items (8) and (9)
13. Automatic chlorine leak detector and alarm if chlorine gas is used
14. Boiler
15. Heating conservation equipment (energy-saving device)
16. Aerator



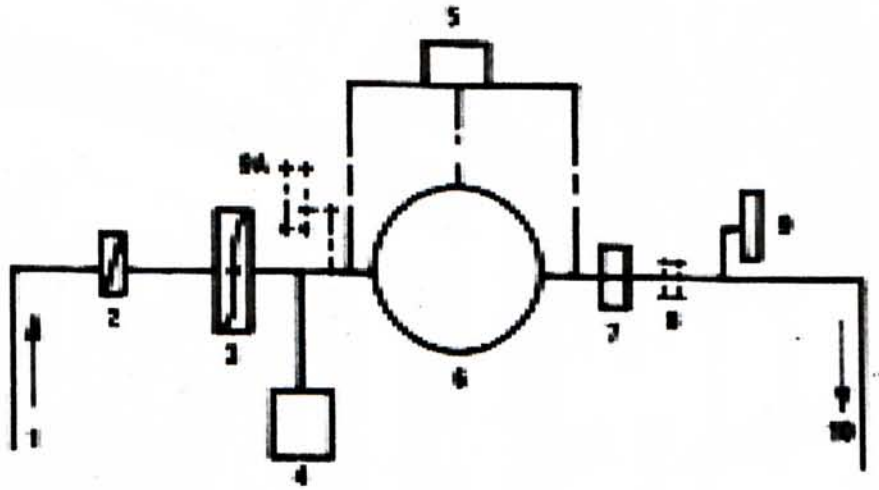
System chart - diagrammatic

Two ways of Allocation of Treatment Set

1. Separate sets for separate pool
   Still function when one set is damaged or maintained
   Different level of treatment for different pools
2. One centralized treatment set
   Easy for maintenance and repair

Precaution for plant room

1. Weather tight
2. Well lit and ventilated
3. Easy access for maintenance and equipment replacement
4. Separated from chlorine room
5. Drained



Layout of treatment plant: 1. outlet main from pool; 2. strain circulating pump; 4. coagulant dosing; 5. pH regulator; 6. filter(s); 7. heat aerator; 9. water disinfecting equipment; 9A. alternative position for disinfe equipment; 10. treated water main to pool.

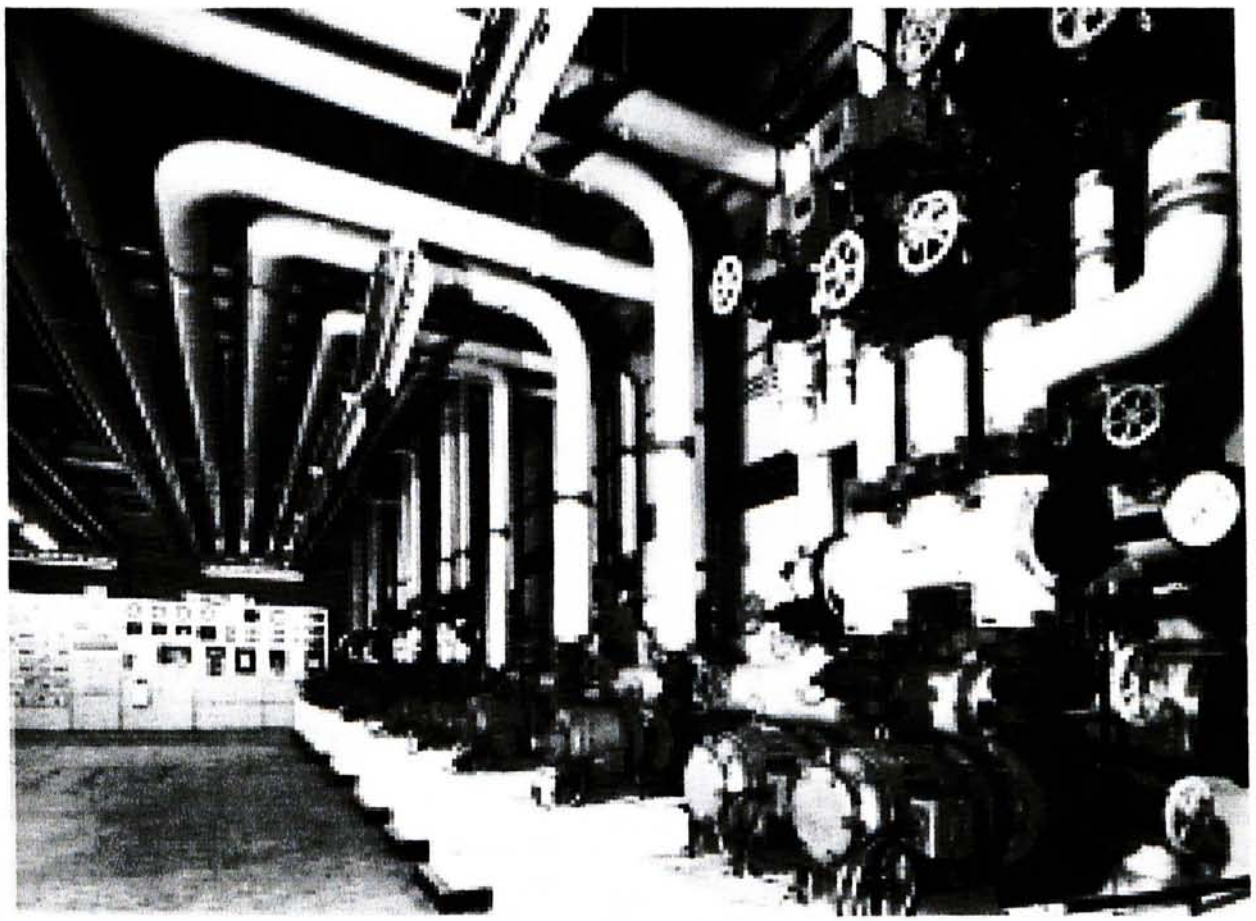
Each component of the Treatment Set

Strainer

1. Cast ironbox w/ inner basket of perforated heavy-gauge copper.
2. Trap coarse matter which will choke the circulation.

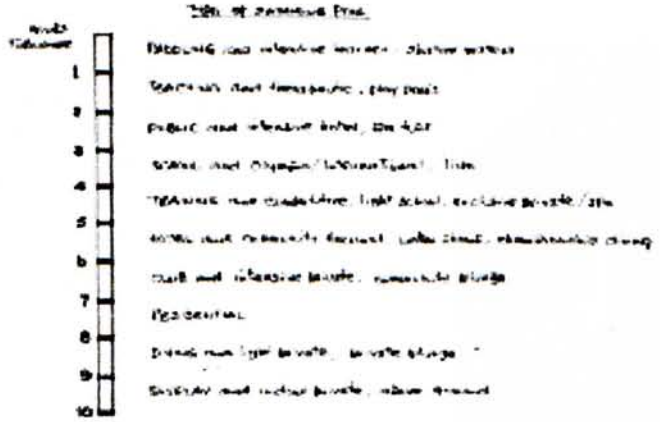
Circulation Pump

1. Better to be more than 1
   - 2 pumps, 75%, work together
   - 2 pumps, 100%, work alternatively
   - 3 pumps, 50%, 2 together, 1 reserved
2. Different sets of pump for different pools
3. Spilt casing type is better as it has max accessibility to impellers
4. Self-priminig type: deposits on filter not reducing output of pump.



Turnover period

1. Time to circulate the whole of water in the pool from the outlets, through the treatment plant back to the pool inlets.
2. Leisure pool = 2-3 hrs
3. Diving pool = 4-6 hrs



Basic turnover ratings: intensively used pools require a far higher turnover than rarely used or decorative pools

Filtration Plant

3 types:

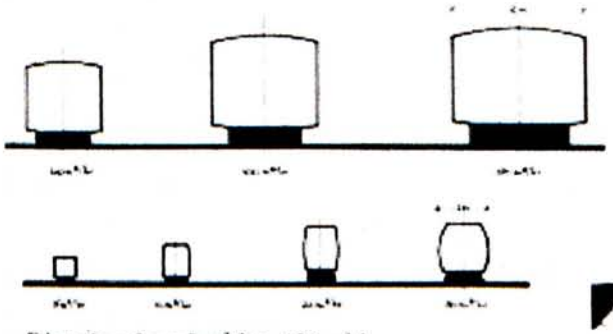
1. Rapid gravity filter – Large area needed
2. Pressure sand filter – Medium rate 20-30m³/ hr
   High rate 50m³/ hr
3. Diatomaceous earth pressure filter – use in small pool

e.g. Standard pool : 50m X 25m X 1.5m = 1875m³
Turnover period = 2.5 hrs
Flow rate = 750m³ / hr
For filter 2.75m dia. (148m³/ hr): total number of filter = 750/148 = 5
Area = 5.92 X 5 = 29.6m³

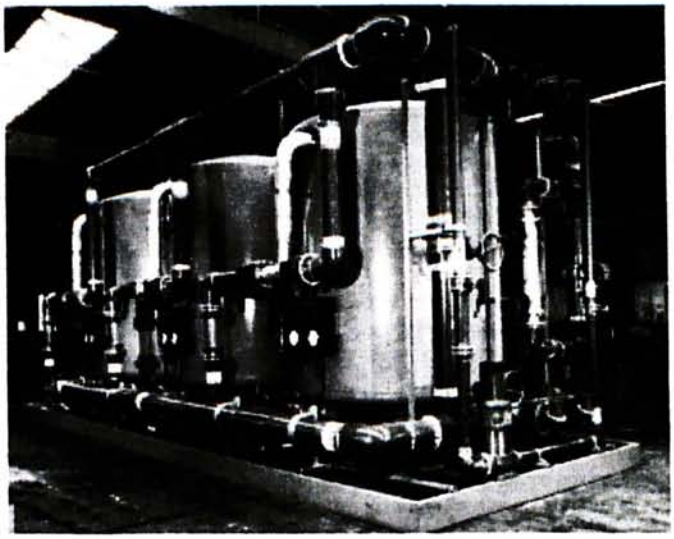
TABLE 7.2

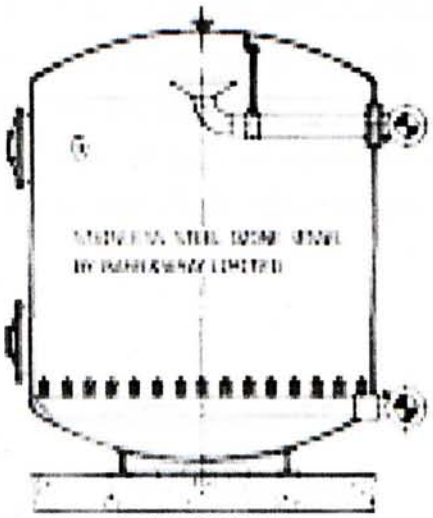
Filter diameter (m)	1·22	1·53	2·14	2·75
Flow rate (m^3/ hour)	30	46	90	148
Filter area (m^2)	1·17	1·83	3·58	5·92
Flow rate (m^3/m^2 per hour)	25·7	25·14	25·14	25·0
Backwash rate (m^3/ hour)	29·33	45·5	89·5	148·0
Flow in drain (litre/min)	488	758	1491	2477

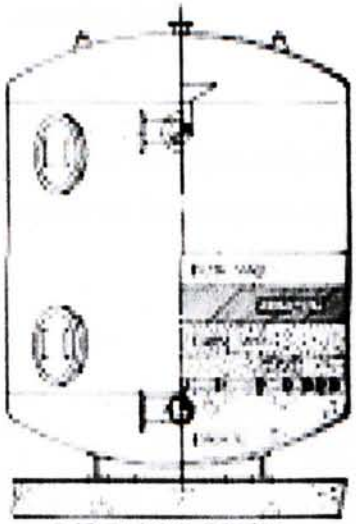
Relative filter sizes

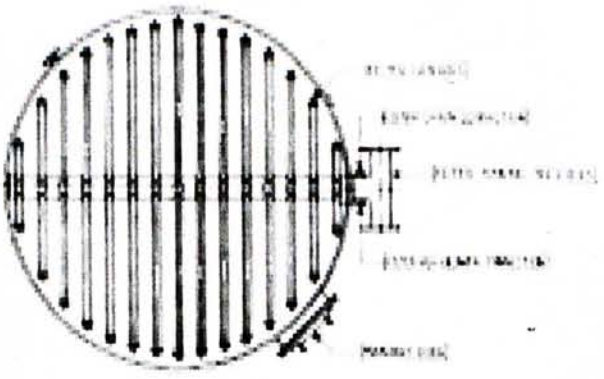


Filter sizes from 5 m^3/h to 150 m^3/h









Vertical pressure sand filter (cutaway) Ran & Wray Ltd. London

Disinfection of pool water

Chlorination

Advantages:

1. Economic
2. Maintain its disinfecting effect for a reasonable period

Disadvantages:

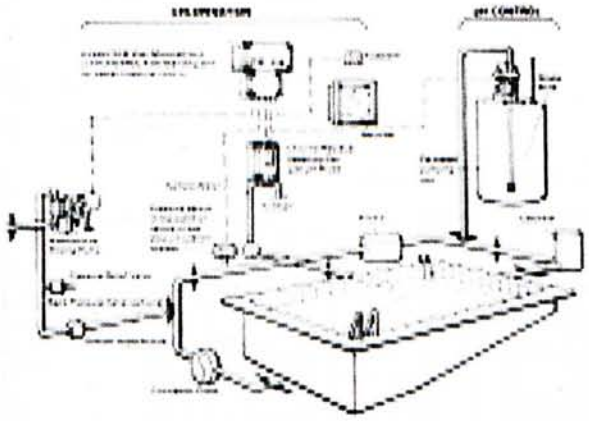
1. Smell
2. Irritate of the eyes, nose and throat
3. Highly poisonous
4. Very corrosive to many structural and engineering materials

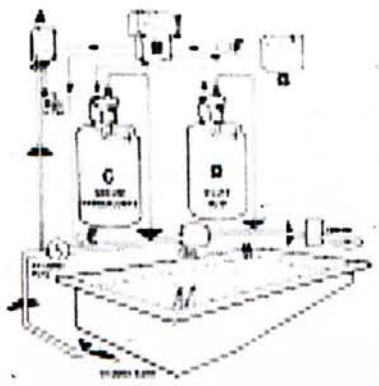
Three methods of chlorinating water

1. Injection of chlorine gas by gas chlorinator
2. Addition of sodium hypochlorite or calcium hypochlorite from solution feed apparatus
3. Addition of other compounds which liberate chlorine or chlorine-containing compounds when dissolved in water

Components of solution feed using sodium hypochlorite

1. Measuring cell
2. HYpHOTRIM wall-mounted control unit
3. Sodium hypochlorite packaged pumping unit
4. Acid packaged pump unit
5. Pressure switch
6. Special audible warning alarm of high or low chlorine residual and pH
7. Optional wall-mounted two-pen recorder for chlorine residual and pH values





Ozone

Advantages:

1. Powerful and rapid oxidizing agent. It destroys bacteria and viruses very quickly
2. No unpleasant smells and no irritation to the eyes, nose and throat of bathers
3. Cut the cost of operation of the main ventilating and heating system

Disadvantages:

1. Cost of ozone id high
2. No very soluble in water so chlorine may added
3. Very short life time 5-15 mins
4. Should be freshly made, high voltage and purified air needed

Calculation:

Assuming using Powered Contacting/Off-Gas system

Ozone output = 400mg/hr

e.g. Standard pool : 50m X 25m X 1.5m = 1875m^3

Turnover period = 2.5 hrs

Flow rate = 750m^3 / hr

Ozone initial dosage = 5.3mg/m^3 (much more than enough, 0.5mg/m^3)

Components of feeding of ozone

1. Ozone generator
2. Mixing device
3. Deozoniser
4. Air vent
5. Activated carbon
6. Hypochlorite dosing equipment

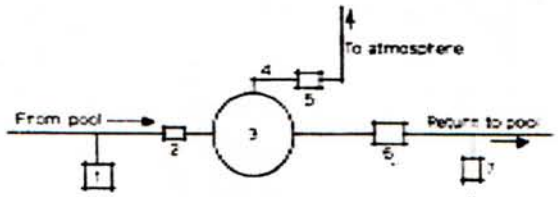
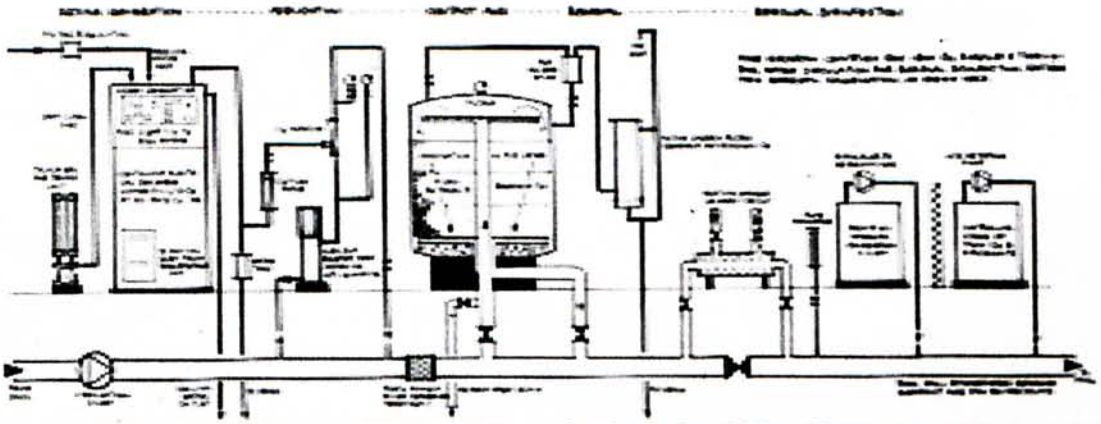


FIG. 7.12. Diagrammatic layout of water treatment plant using ozone: 1. ozone generator; 2. mixing device; 3. filter/deozoniser; 4. air vent; 5. activated carbon; heater; 7. hypochlorite dosing equipment (courtesy: Barr & Wray Ltd, London

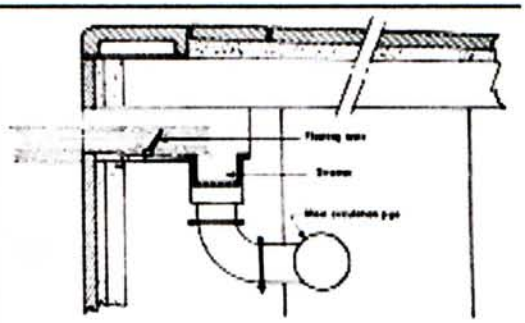
Other disinfecting agents

1. Bromine
2. Chlorine dioxide
3. UV light



Water Circulation

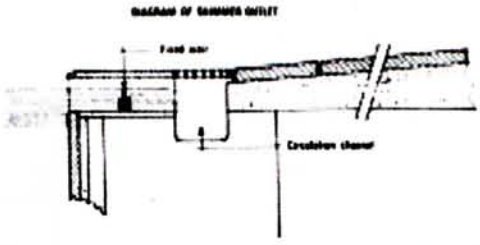
1. Avoid pocket of dead water
2. Avoid short-circulation



Outlet

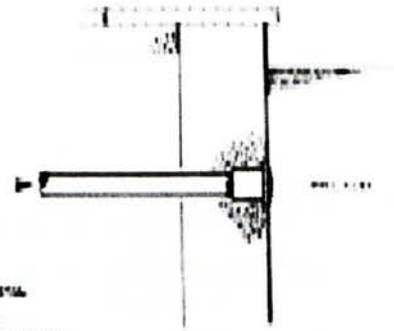
1. Skimmer-weir – around the pool, >60% water
2. Pool floor outlet – anti-vortex device, <40% water
3. Sump channels
   - Used in large pool
   - Continuous weir along the long walls
   - Outlet from channel = 50-75mm dia

Not mixing up w/ the drain of the building

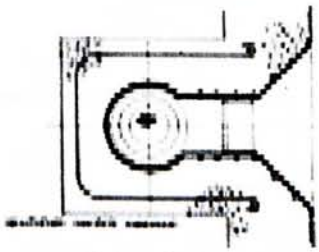


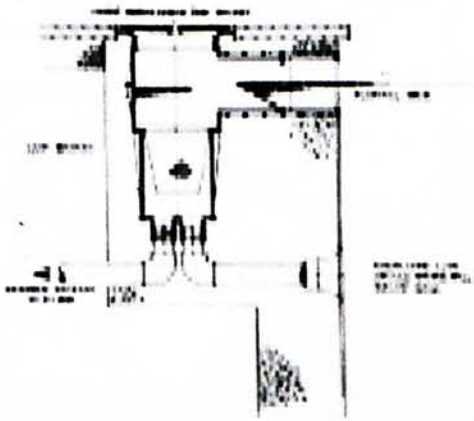
Inlet

1. Velocity <=0.3m/s
2. Balancing tank – even out ariations in the quantity of water leaving and entering the pool, size = 70L/person

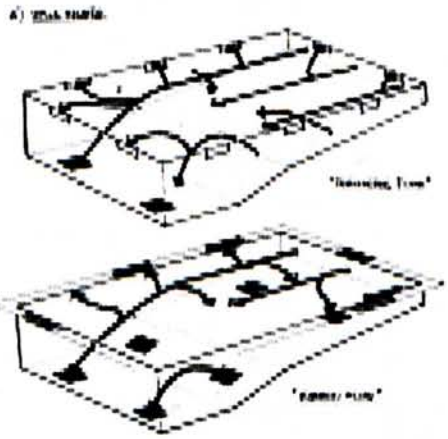


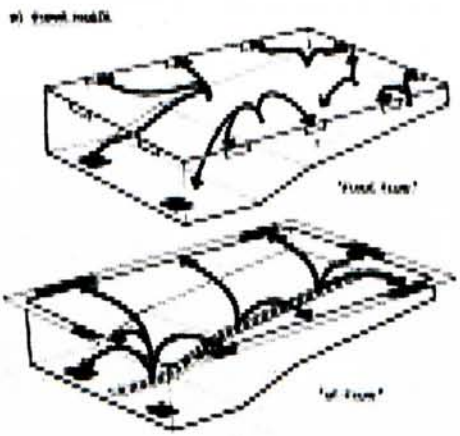
Flow return inlet unit pipe bal





Automatic skimmer weir with throat extension

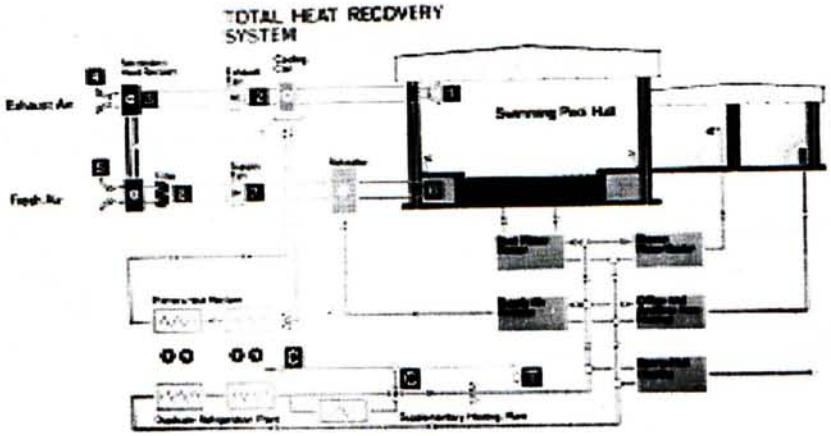


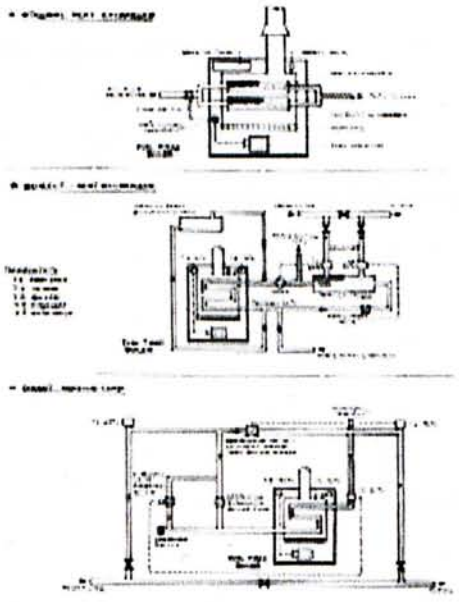


Water circulation systems – wall and floor inlet: perimeter, ribbon, floor, up-flow

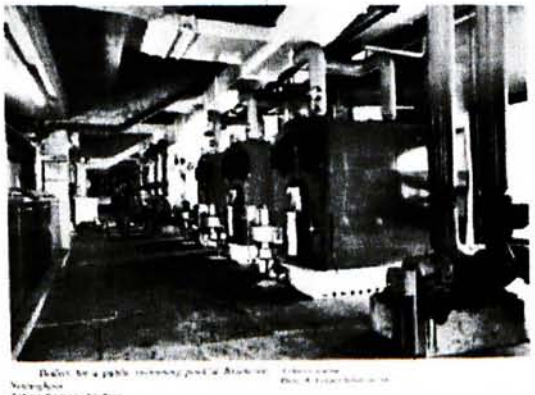
Heating System

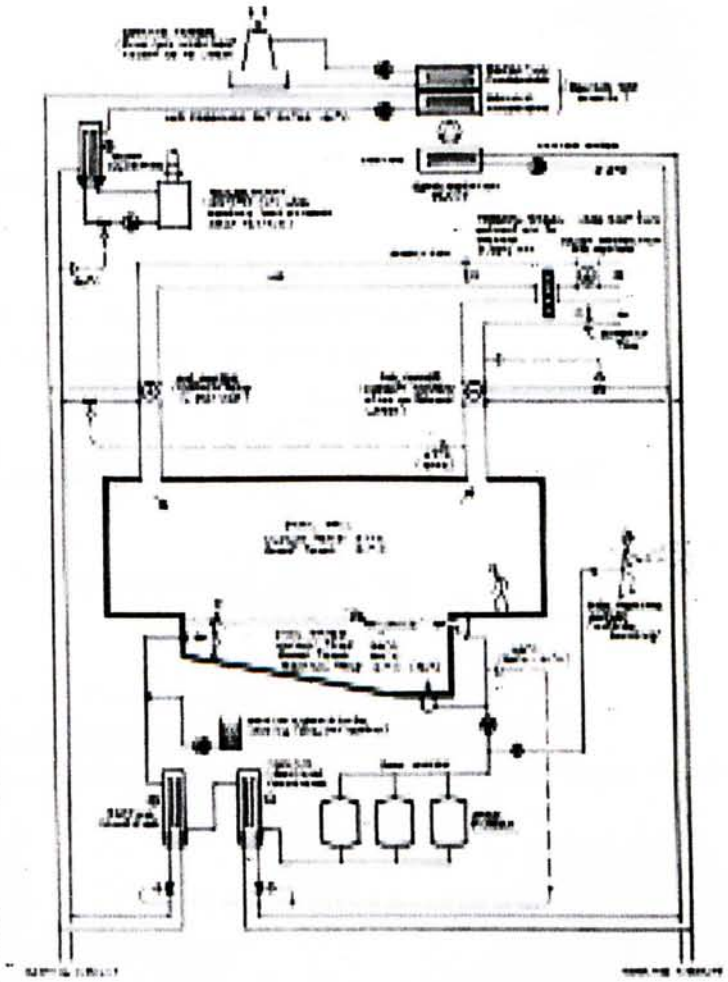
1. Water temp = 26-27℃
2. Pool hall temp = 1℃ higher than water temp
3. Warm bench, floor, wall can be used
4. Ventilation is important for high humidity in pool hall
5. In –ve pressure as no smell go out the pool hall
6. 2 types: by fuel or by solar





Pool heaters – boilers: heat exchangers and heating loop





Heat dump/leisure pool/fire-fighting tank
Engineer: Sinnyen Varming Mahaby
Architect: Gibson Barnes & Partners

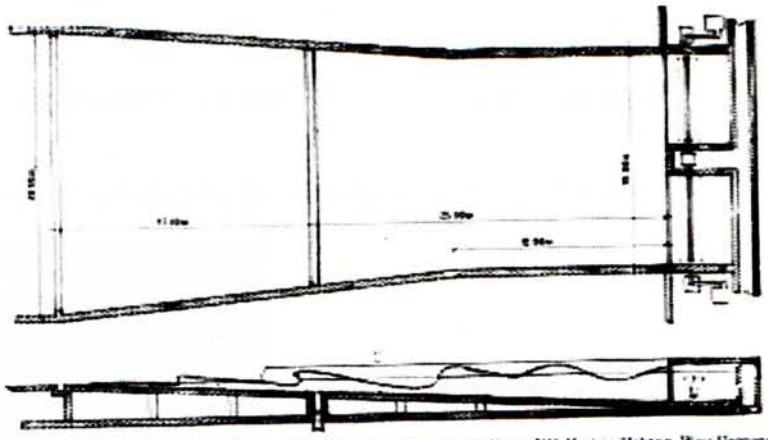
Wave Making Equipment

3 methods:

- Swing arm
- Compressed air
- Reaction of falling water

Swing Arm Type

1. 17.5-18 oscillations/min.
2. 80 brake horsepower required
3. Machine underground
4. Silent operation



Plan and section of pool designed for artificial waves (courtesy: F. Kaiser KG Heide-in-Holstein, West Germany

Compressed Air Type

1. Less maintenance
2. Pool length > 25m
3. Width in shadow >= 2 X width in deep

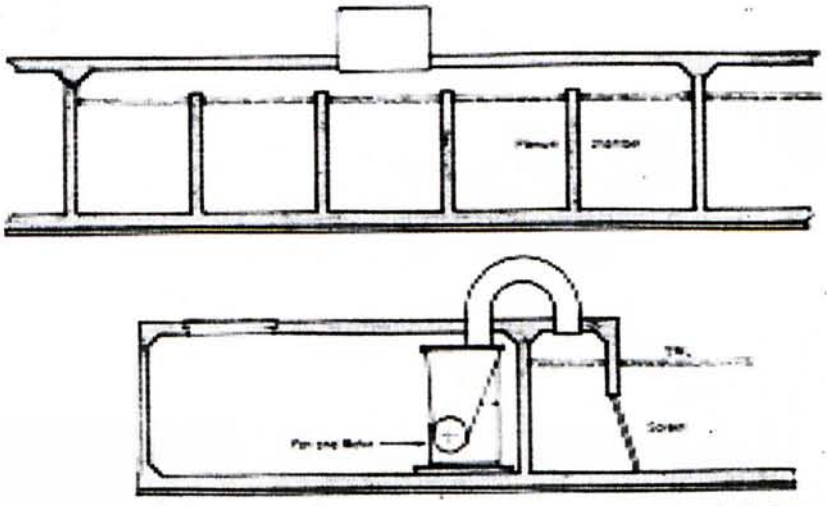


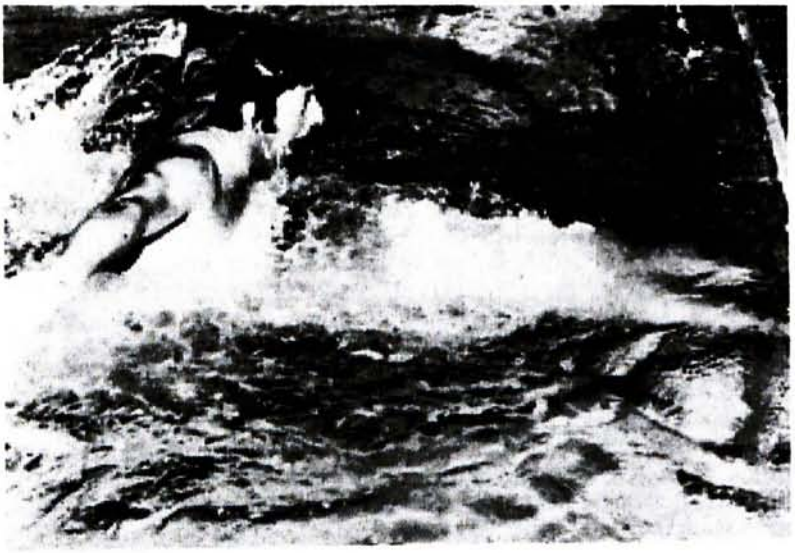
Diagram showing general arrangement for making artifical waves by compressed air (courtesy: Arnfield Engineering Ltd)

Falling Water Type

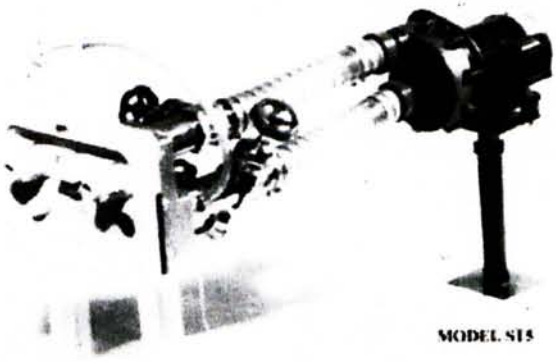
1. A large column of water falling from certain height
2. Only used in outdoor

Jet Equipment

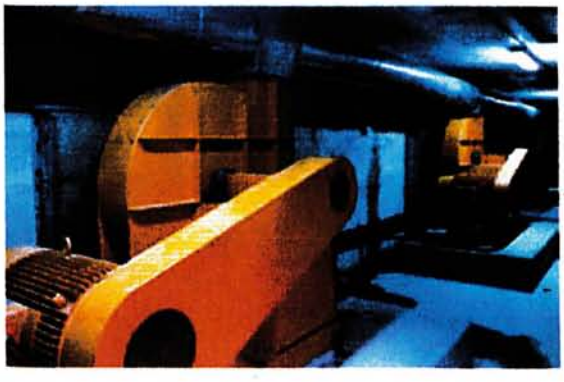
1. It is a wall mounted device that create a strong current of water to swim again
2. The unit should be located in water 1.1 – 1.4m deep.
3. Speed = 2m/s
4. The jet delivers about 800 L/min
5. The nozzle should be set about 0.25m below water and the suction inlet about 0.9m below that.
6. 3-phase power for 3kW motor
7. The machine equipment requires a machine room with a cross section of at least a width b=3.0m and height h=2.0m.
8. The wave chamber requires a width of -according to wavelength- 1.3 to 1.8 m.

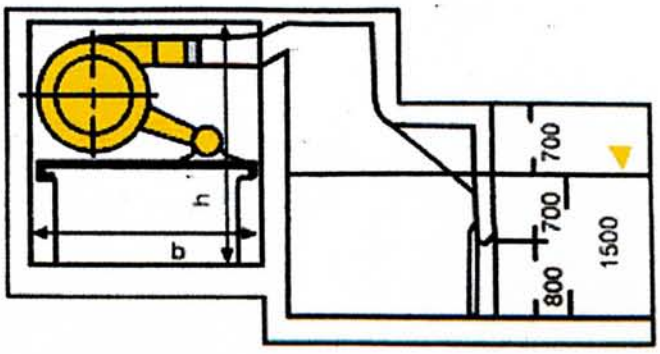


View of 'Badu-Jet'



MODEL ST5





4. Sketches

A. Water Sport Transformation
B. Coimbination

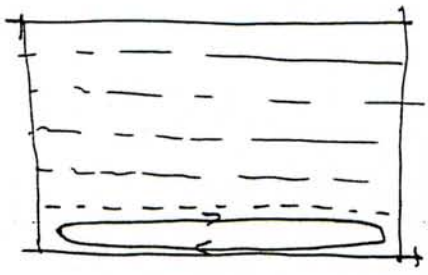
Water sport transformation sketches

In this exercise, possible transformation from normal water sports to the way that can be played in limited area is being sketched out. Some of them is feasible and can be part of the centre, like being circulation. And some of them are unable to transform to a way that can situated in urban area.

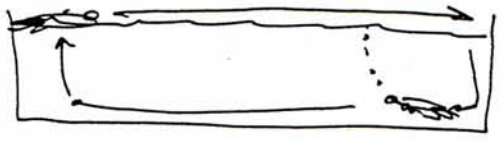
Water sport transformation sketches
Feasible idea

SWIMMING.

IN LOOP.

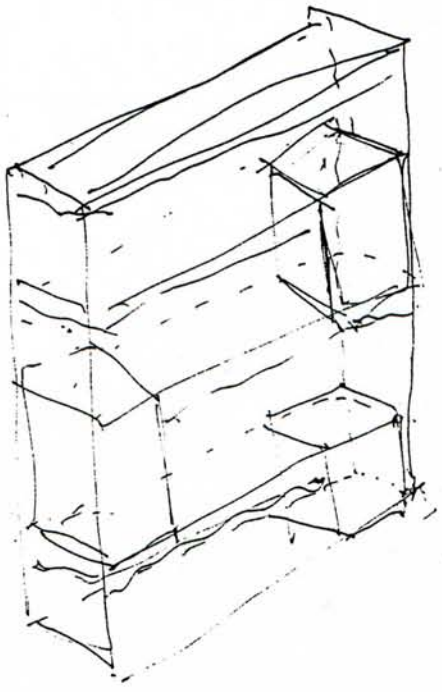


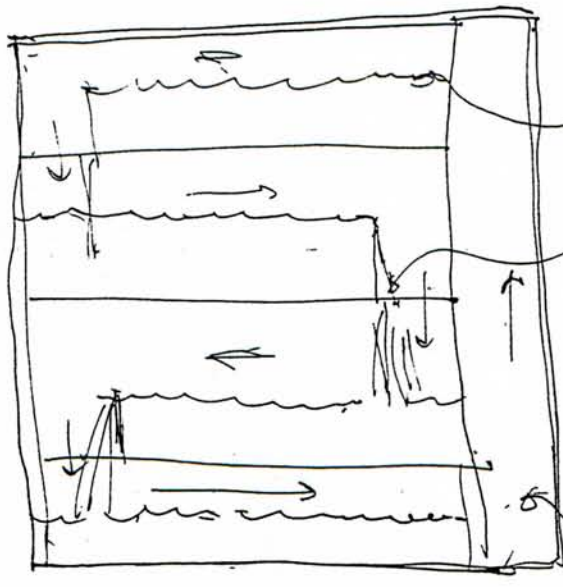
ON THE SURFACE.

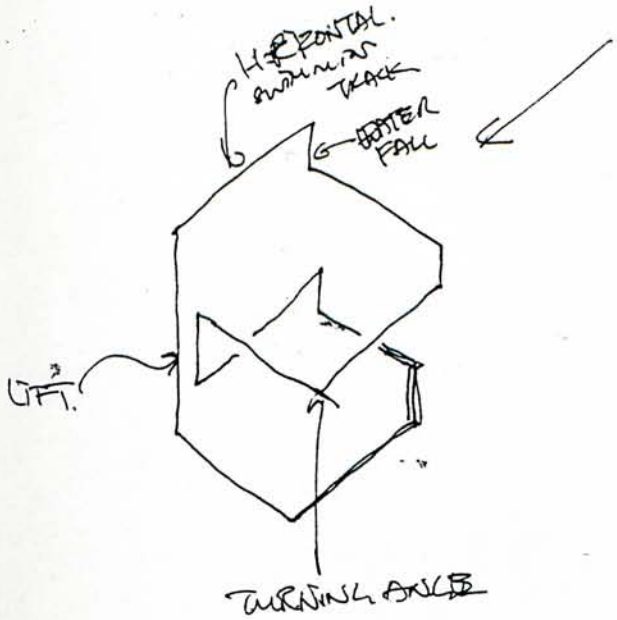


LOOPED VERTICALLY.

SWIMMING + SNORKELLING.







TURNING ANGLE RATHER THAN JUST STACKING IT UP.

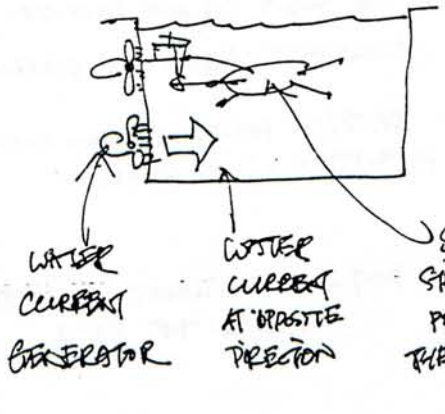
LIFT.

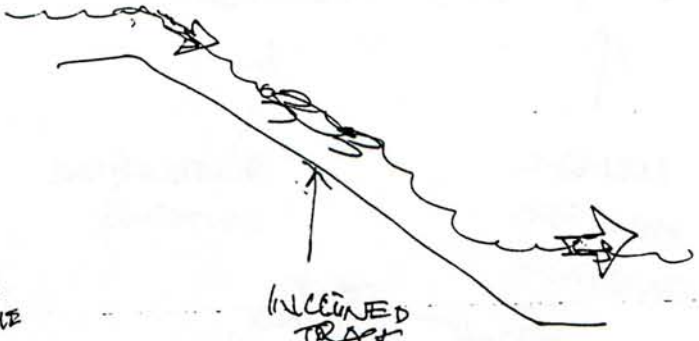
JUST LIKE THE DOWNWORD DIVING.

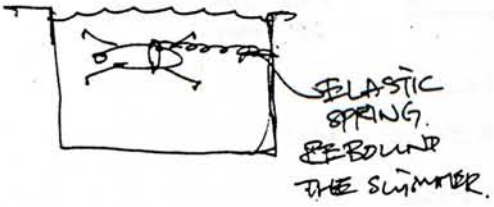
LIFTING MECHANISM.

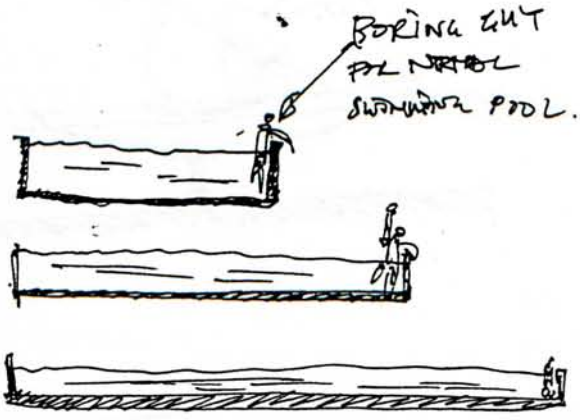
SWIMMING.

DYNAMIC EQUILIBRIUM.





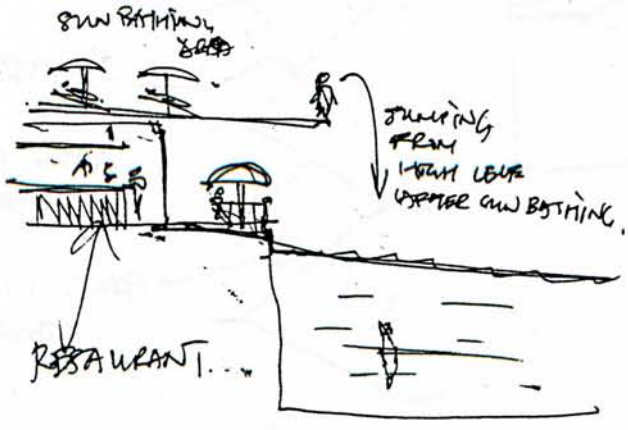




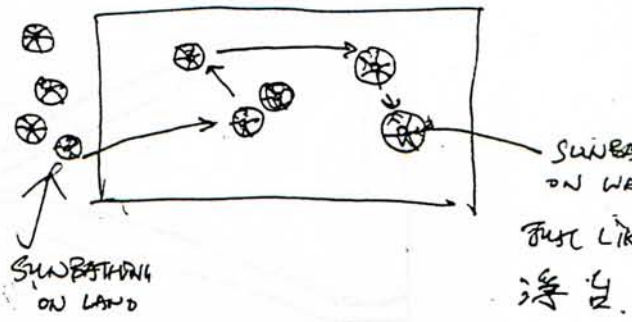
CAN ADD RESTAURANT OR OTHER ACTIVITIES. AT BELOW.

SUNBATHING.

SUNBATH → GET HOT → COOL DOWN BY SWIMMING.



PLAN:-



SWIMMER CAN SWIM FROM ONE TO ONE AND TAKE SUNBATHING.

CANOEING

FLAT OR INCLINED.

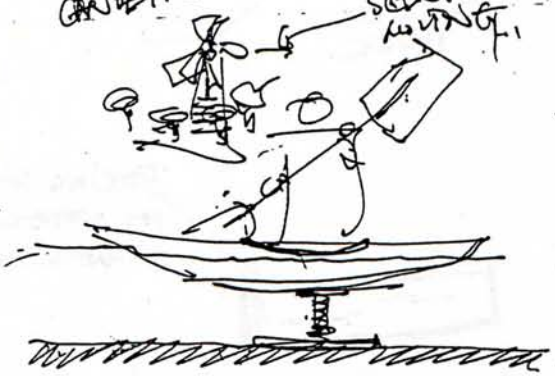
NORMAL OPEN CANOEING.

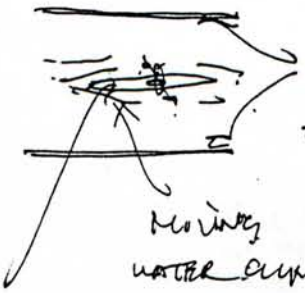
WHITE WATER CANOEING.

A: SINGLE, MAX. DOUBLE.

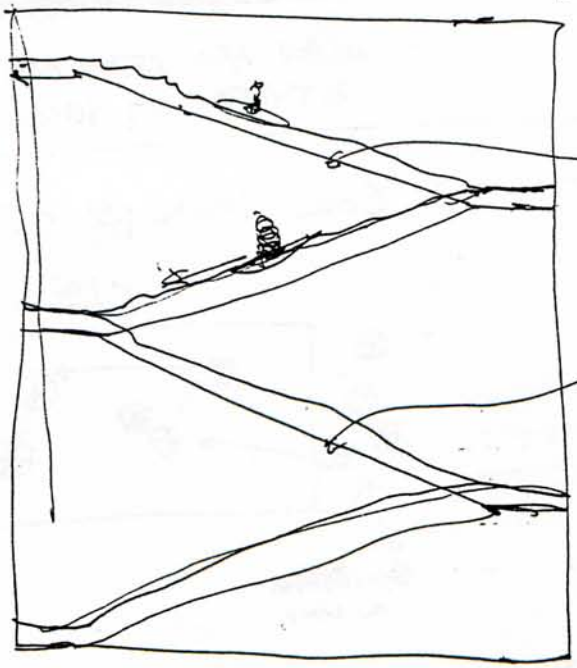
- EASY TO GET IN AND OUT OF CANOE.
  i.e. CHANGING ACTIVITIES EASILY.
- IN SEATING POSITION - CAN COMBINE W/ ACTIVITIES LIKE FILM....

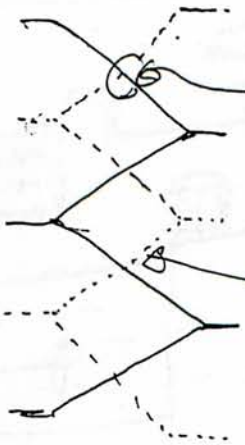
D: SMALL BOAT. - CAN SUPPORT ACTIVITIES INSIDE THE BOAT.

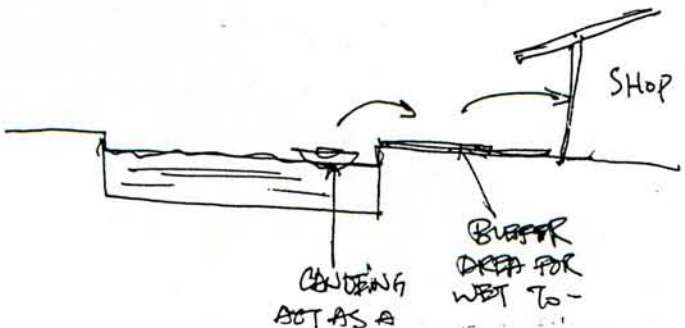




THE CANOE BASIN

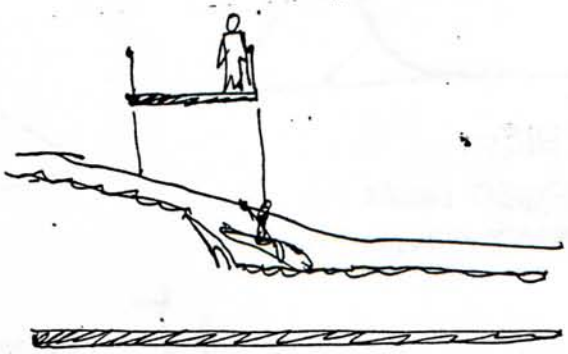






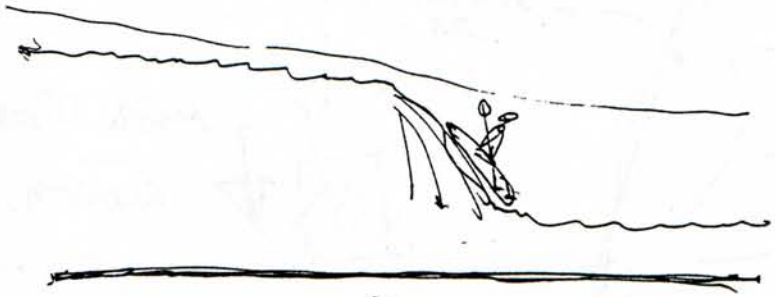
KAYAKING.

- GOOD WAITING AREA THAT THE MOMENT OF WATER, SOUND OF WATER AND THE SPORT IS GOOD VIEW FOR PEOPLE.

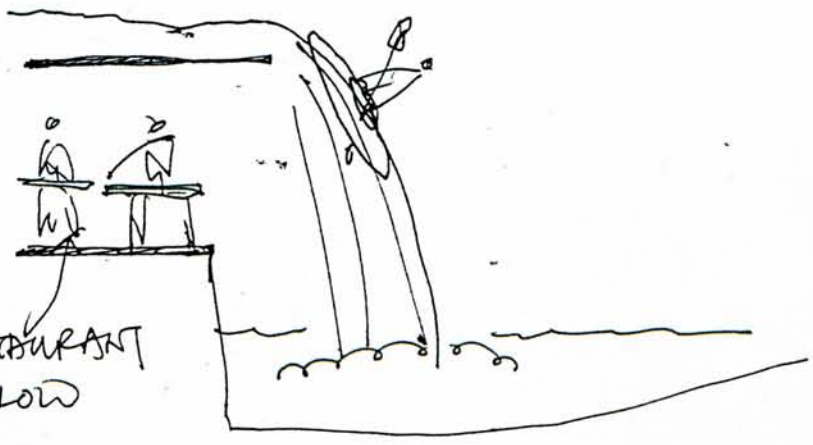


ENLARGE THE BRIDGE TO BECOME A PLATFORM.

ENLARGED PLATFORM CAN BECOME RESTAURANT.



- SWAP THE ACTIVITIES.



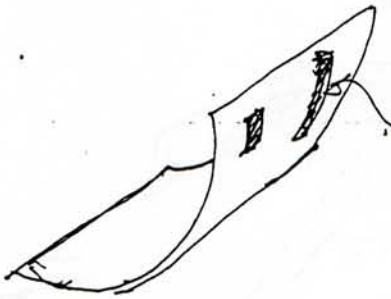
RESTAURANT BELOW

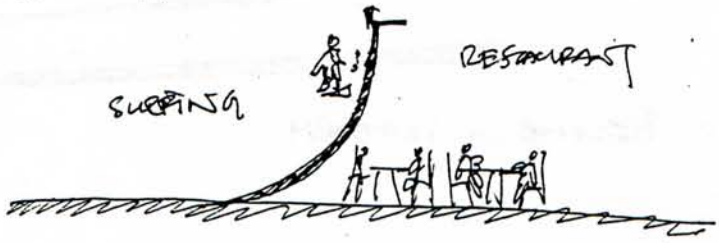
SURFING

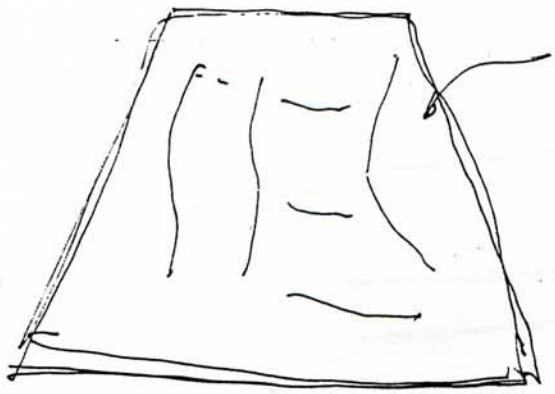
SHEET OF WATER.

BALANCE OF GRAVITY + WATER CURRENT.

HIGH SPEED WATER PROJECTING.



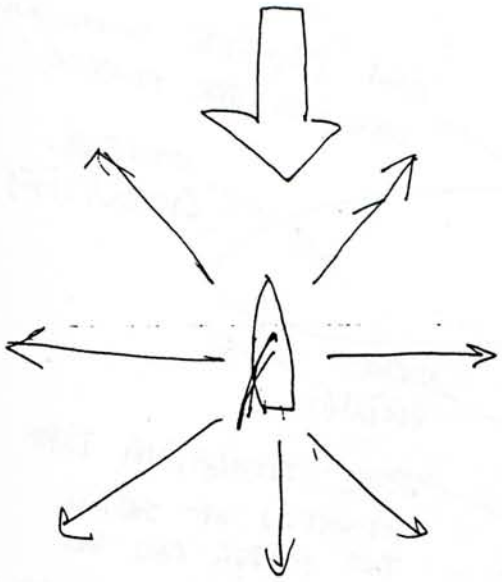




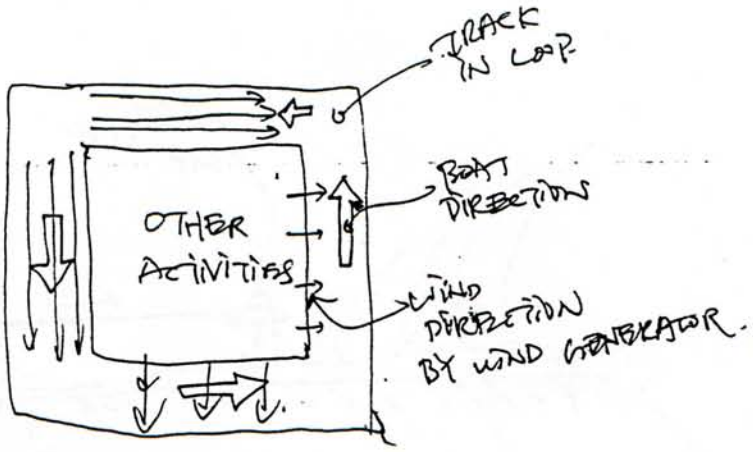
MOVING DIRECTION + GRAVITY.

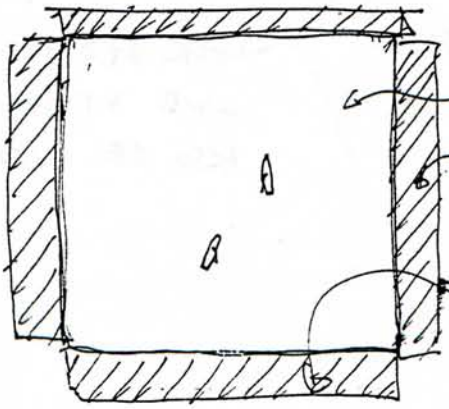
WATER CURRENT DIRECTION.

WIND SURFING ~~/ SAILING~~



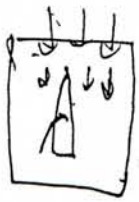
- FORM SOME TRACK WITH DIFF WIND DIRECTION.





WHICH WILL CHANGE THE WIND DIRECTION RANDOMLY.

← NOT VERY PRACTICAL AS THE POOL SHOULD BE VERY BIG AND THE SURFACE AREA IS NOT LARGE ENOUGH.



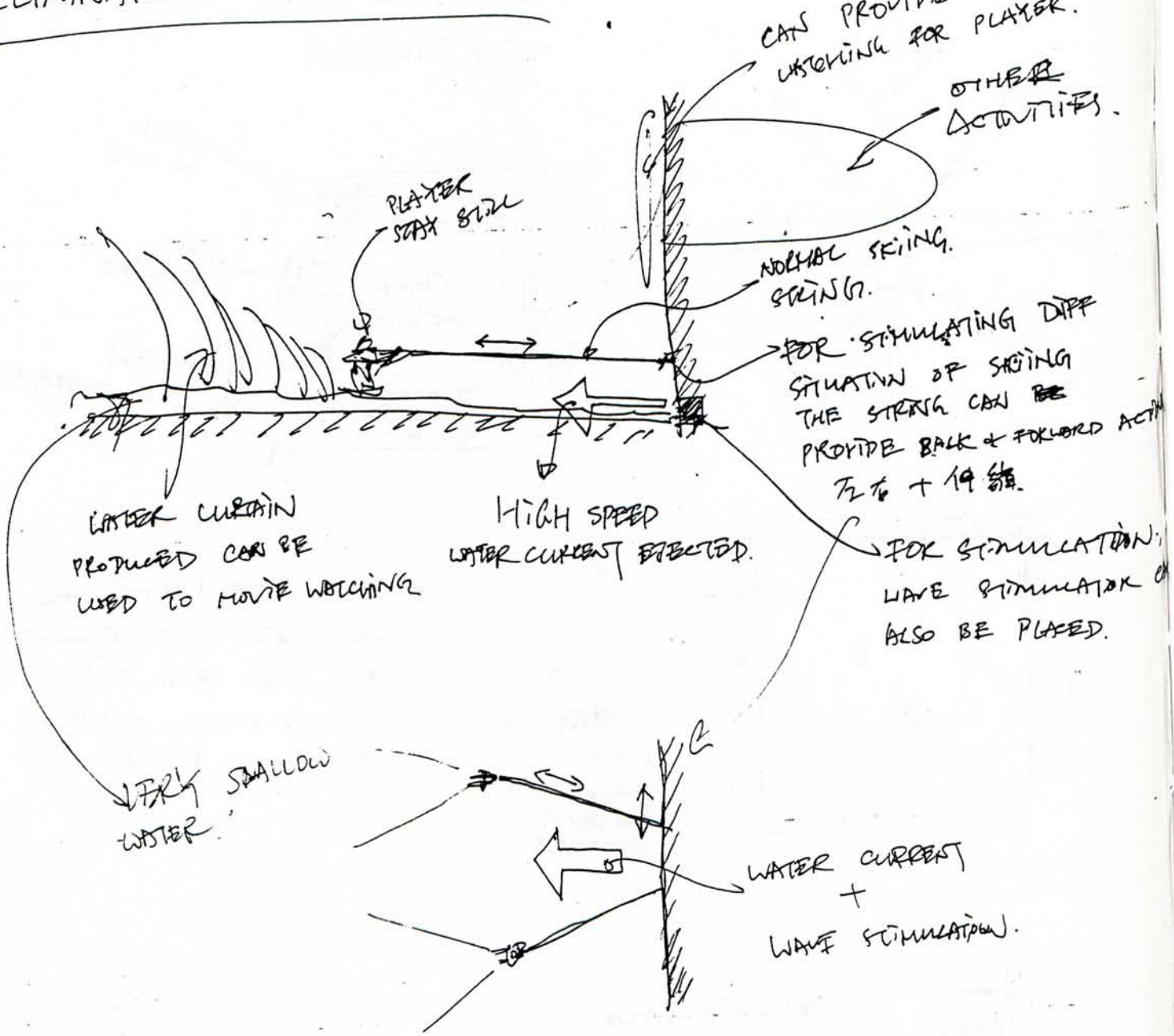
- LIKE SIMULATOR.
- WIND BY SIMULATOR AND ~~WIND~~ WATER CURRENT. IS CALCULATED BY COMPUTER. TO MAKE THE BOARD STAY.

OR NO MATTER..

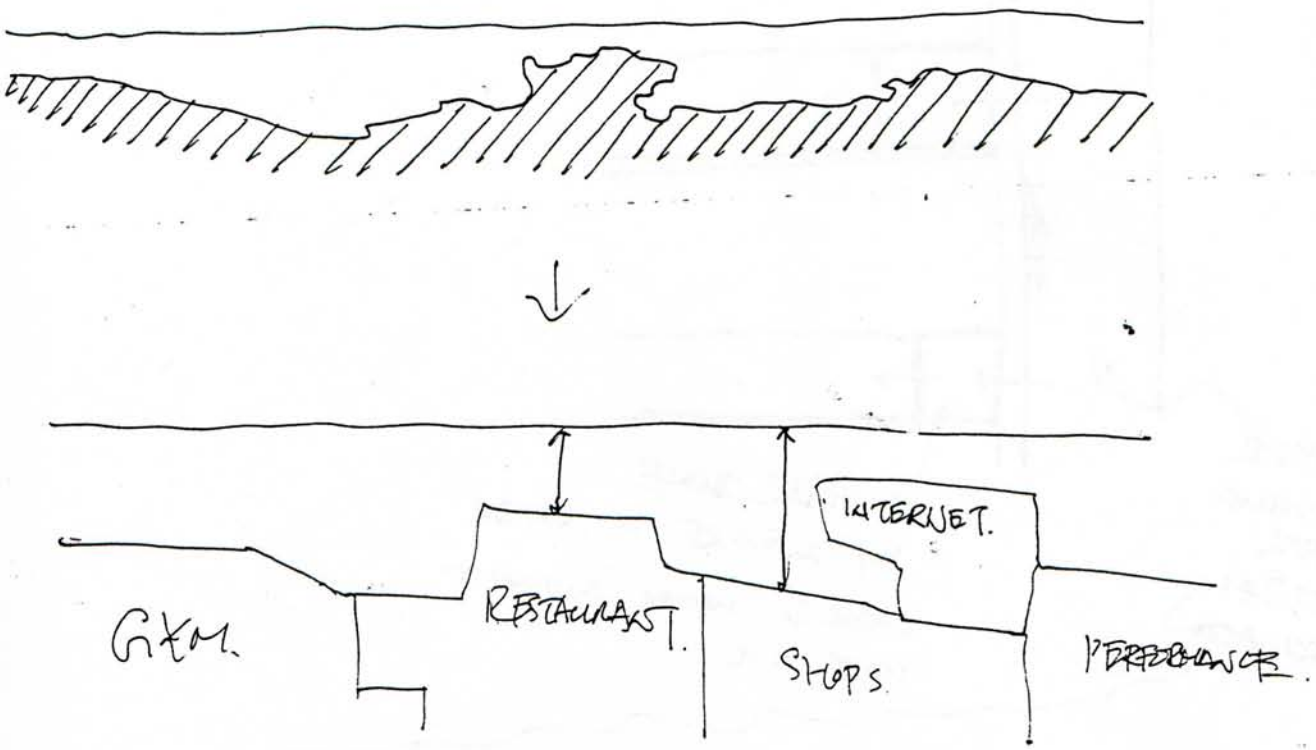
1. STICKING OUT OF THE BLDG

WATER SKIING.

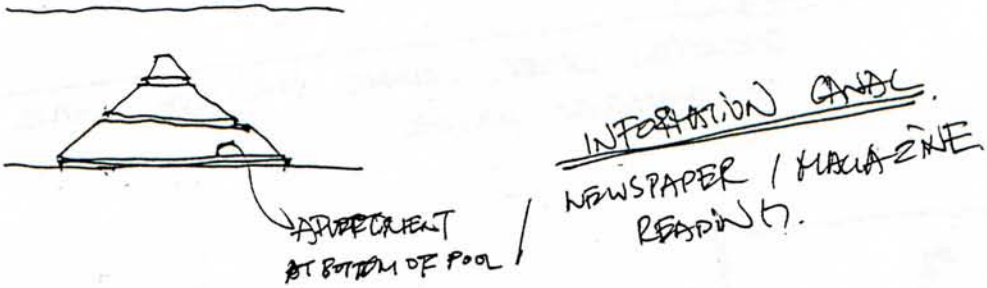
ELIMINATION OF SPEED BOAT.



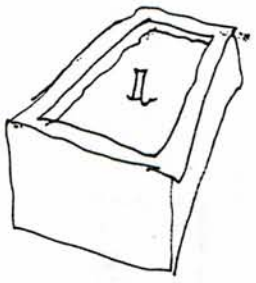
N ORKELING.



- SOMETHING U CAN SEE IN SWALLOW WATER
  BUT SOMETHING U SHOULD DIVE DOWN TO HAVE A CLOSER LOOK.

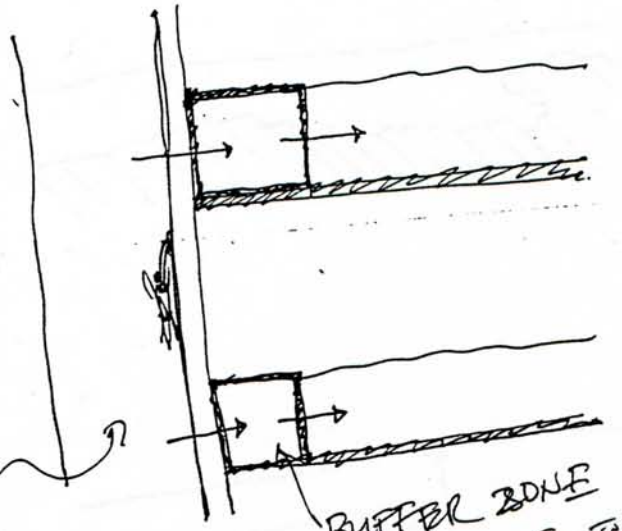


- MAINLY FOR HORIZONTAL CIRCULATION.
- POOL FOR JUST FLOATING, FOR THINKING. AND RESTING.



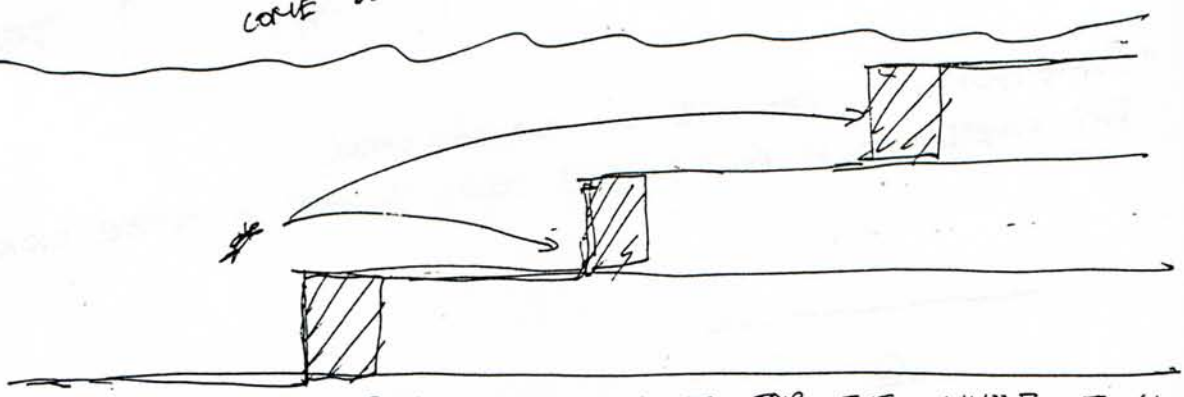
SCUBA DIVING.

VERTICAL CIRCULATION

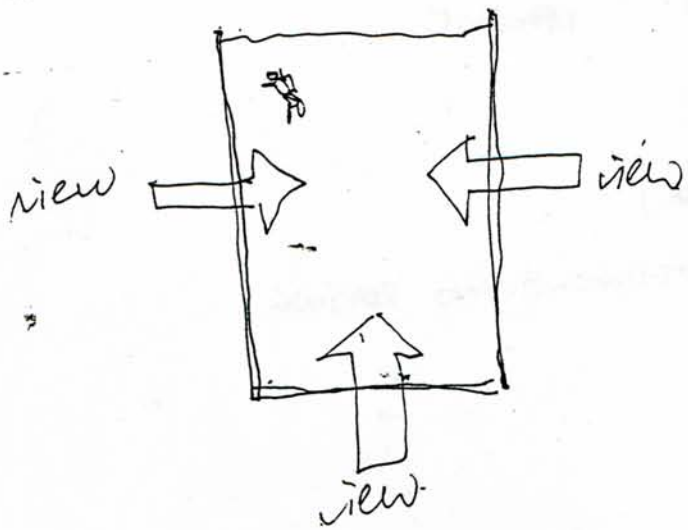


WATER COLUMN FOR VERTICAL CIRCULATION

BUFFER ZONE W/ 2 DOORS - TO PREVENT WATER IN WATER COLUMN TO COME OUT.

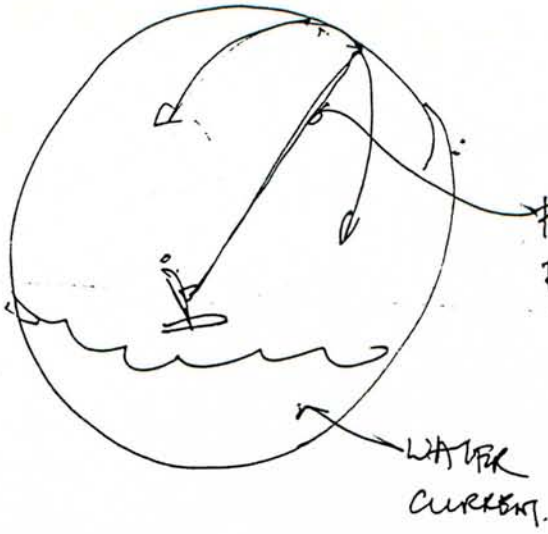


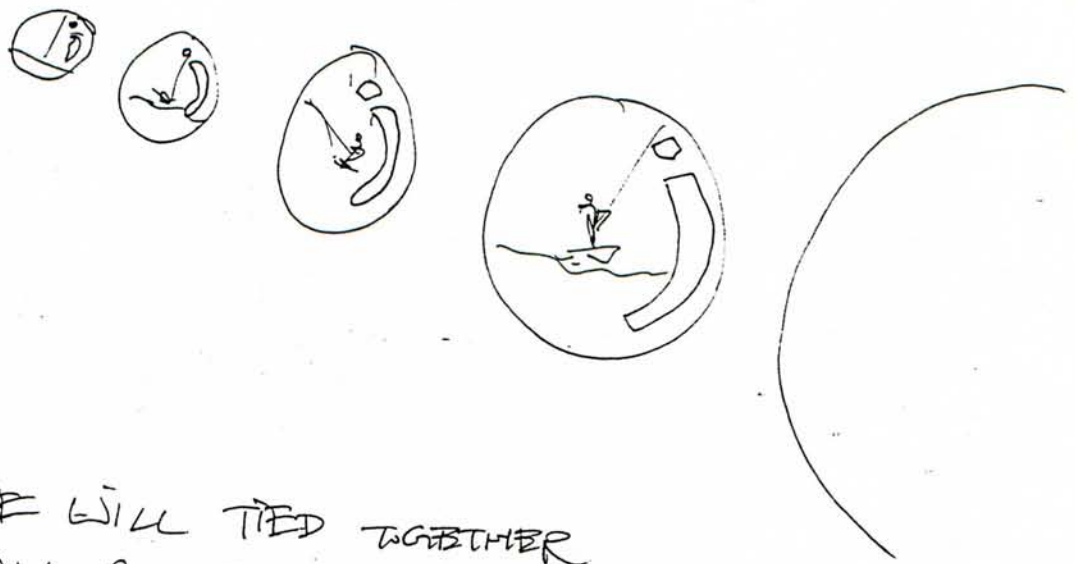
ONE OPEN WATER COLUMN FOR THE WHOLE TANK. TO EMERGED INSIDE..



Water sport transformation sketches
Failed idea

KITE — BOARD SURFING.





- AS ROPE WILL TIED TOGETHER EACH BALL GOT ONLY ONLY ONE PLAYER.
- THE DRAG OF FREE MOVING ROPE IS UNKNOWN.
- SPACE CONSUMING.

Combination Sketches

In this part of exercise, a number of ways that combine the water sports with the urban entertianment. In combination, water sports take a role of the followings. As circulation bothe vertical and horizontal, as a ground to have the urban entertainment acting on, providing views and as a content to change the natural of the urban entertainment. For the combination, it can be just one water sport combinaed with one urban entertainment but also can but a mix of serveral activities.

Combination Sketches

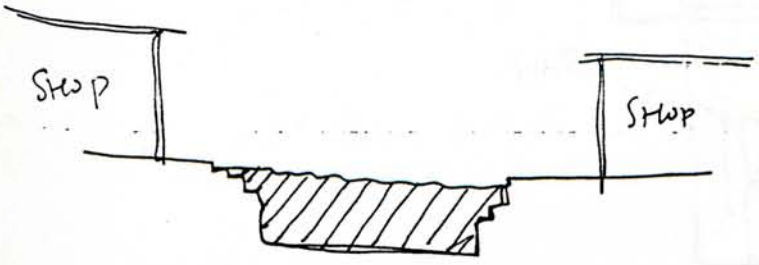
Feasible idea

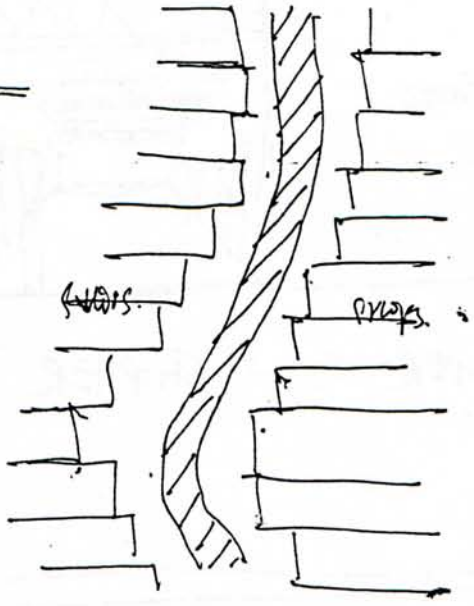
For the feasible idea, the outcome of the combination is no longer the original activities, the nature of the activities is changed, e.g. the diving can be mixed with shopping, the way of shopping is changed by shopping inside the water, and the nature of divinig is changed from watching the water creature to window shopping.

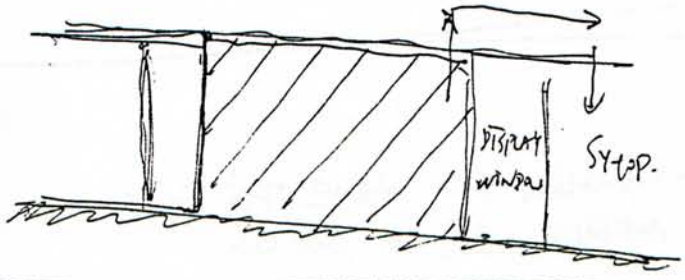
SWIMMING + OTHERS

+ SHOPPING.

AS CIRCULATION.



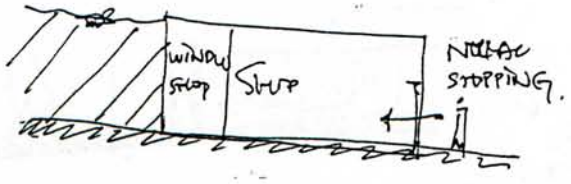


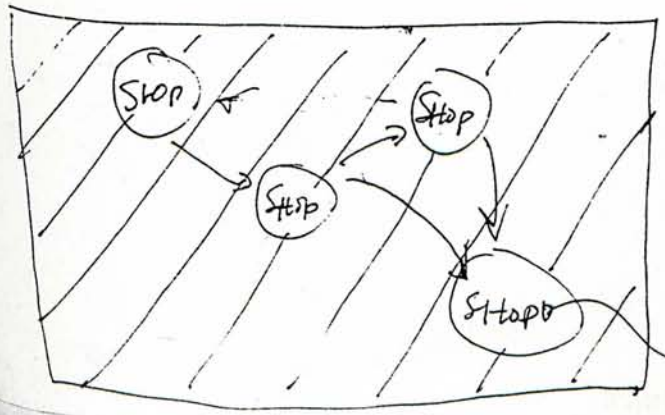


PROBLEM: WET BODY.

WATER POOL FOR WINDOW SHOPPING ONLY.

U GO SHOPPING IN NORMAL SHOPPING MALL



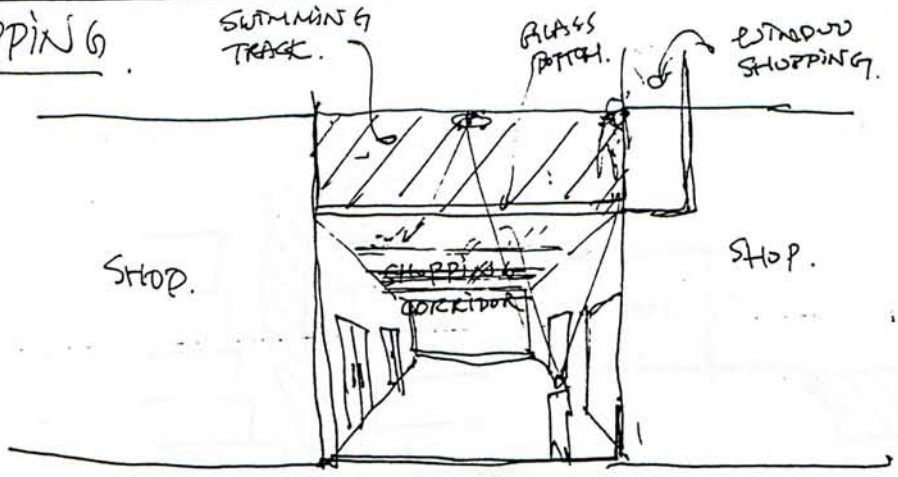


- BREAK THE NORMAL SHOPPING MALL SEQUENCE. TOTALLY FREE FOR SHOPPING.

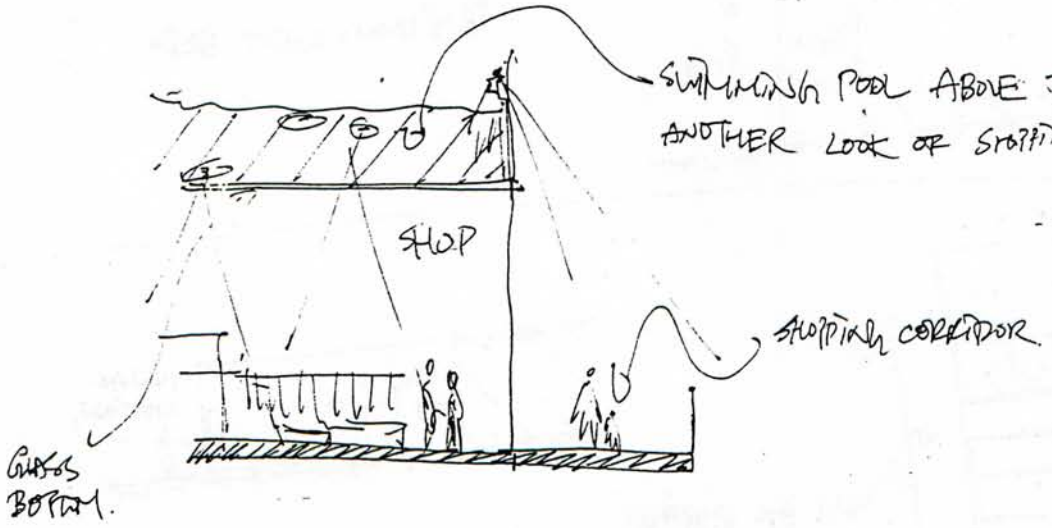
浮台 LIKE SHOPPING ISLANDS

SWIMMING + OTHERS

+ SHOPPING.

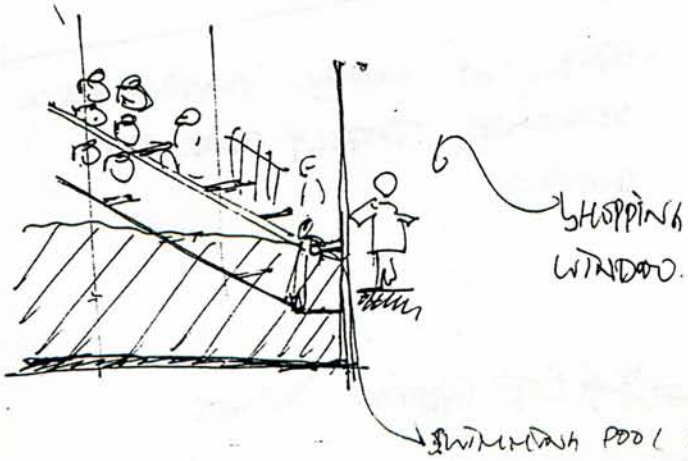


SWIMMER ⟷ SHOPPER IN SHOPPING CORRIDOR.



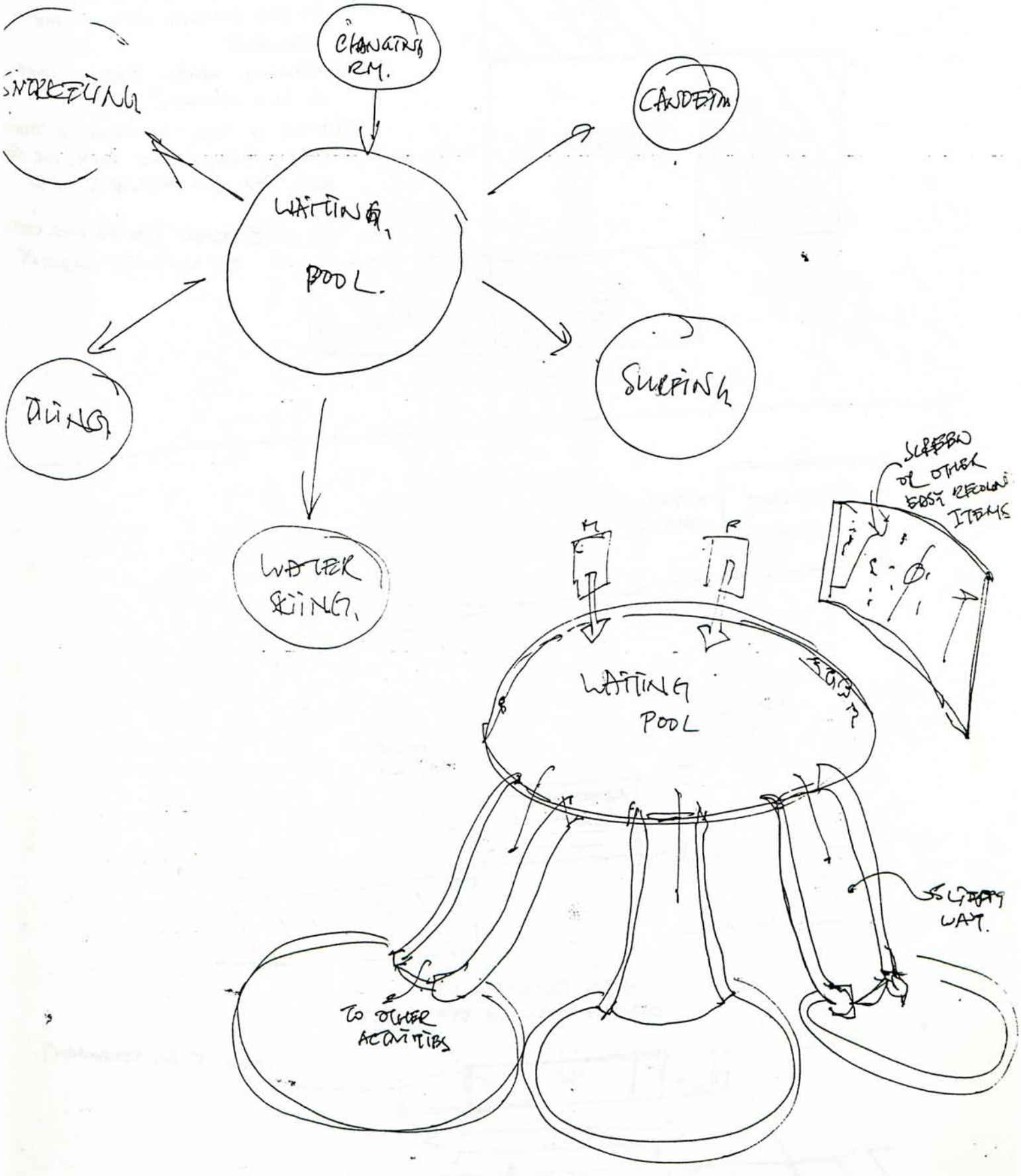
-- SWIMMER ⟷ SHOPPERS INSIDE SHOP.

COMBINATION SWIMMING POOL EDGE W/ WINDOW SHOPPING.



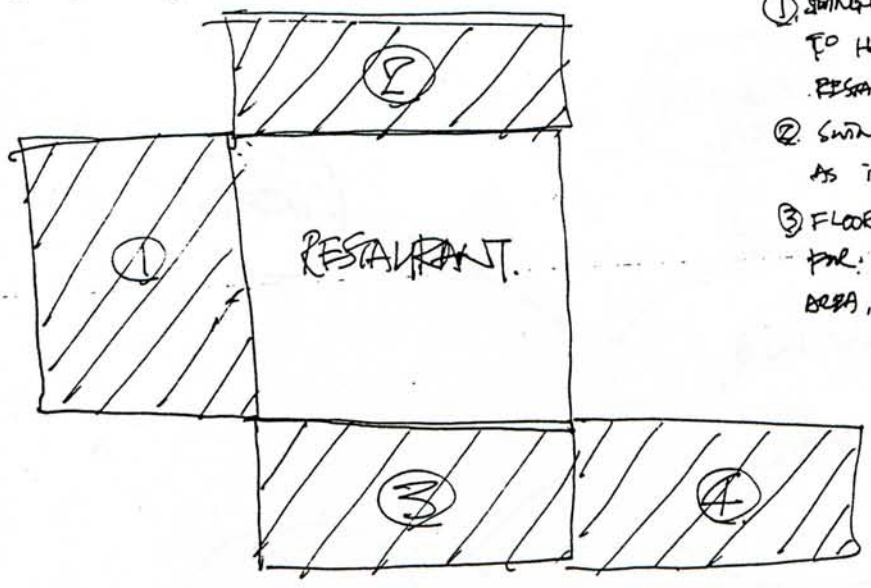
SWIMMING + DIVERS.

& WAITING AREA.



SWIMMING + OTHERS

+~~RESTAURANT~~.

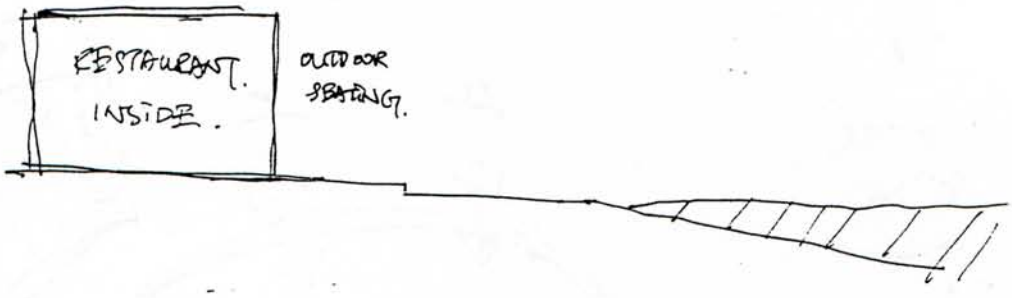


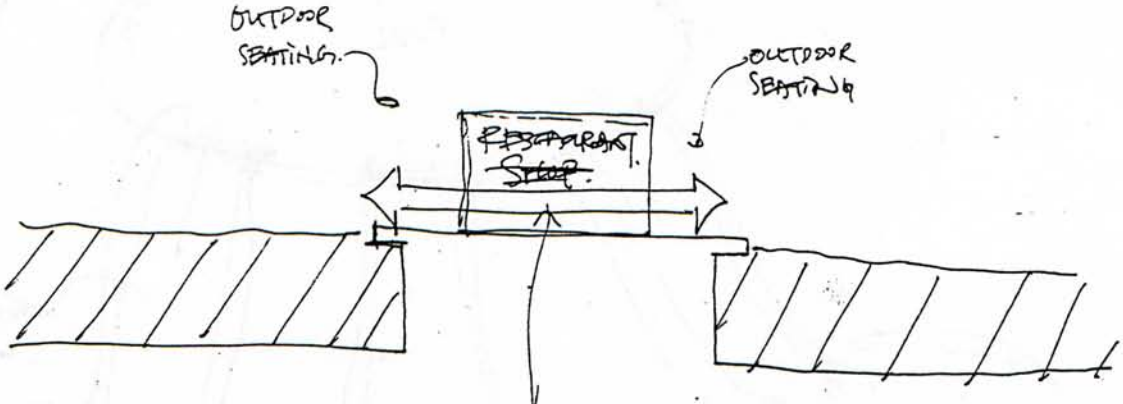
① SWIMMING LIKE AN AQUARIUM. TO HAVE PARALLEL VIEW TO THE RESTAURANT.

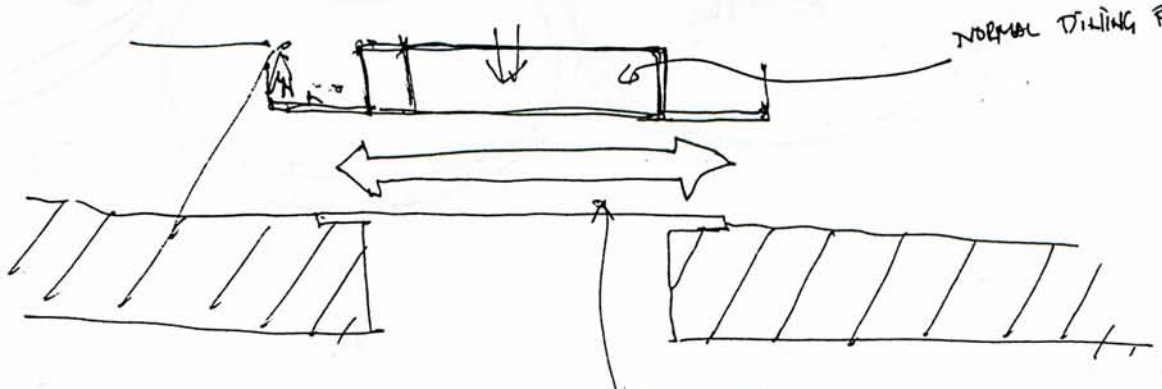
② SWIMMING ABOVE - GOOD TO HAVE AS IT IS ABNORMAL.

③ FLOOR OF THE RESTAURANT IS TRANSPARENT FOR CIRCULATION PART ONLY. FOR SEATING AREA, VIEW WILL BLOCK BY THE TABLE.

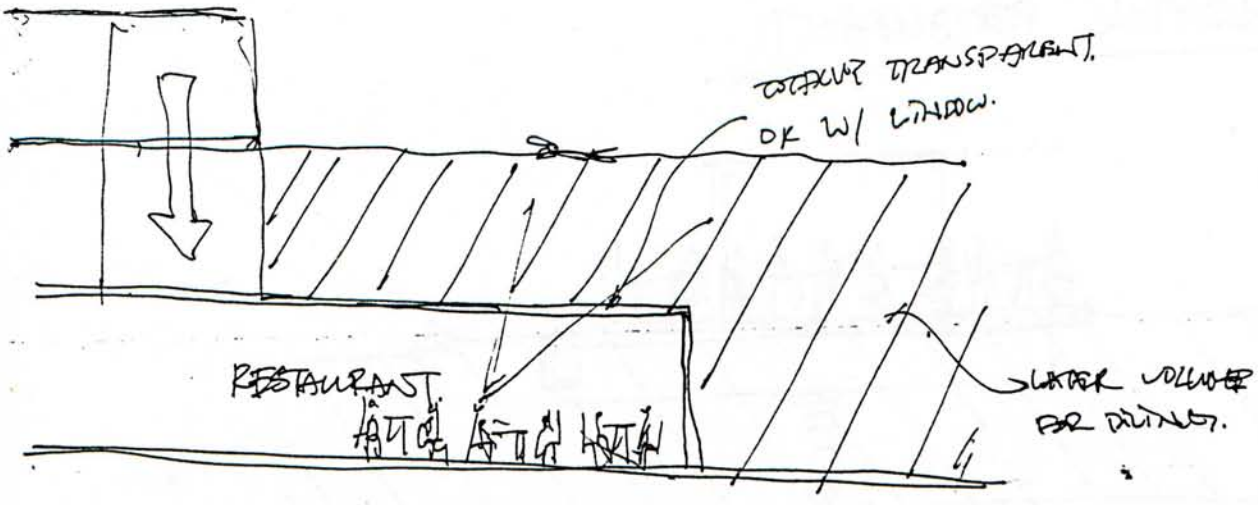
④ NORMAL SEATING CAFE SETTING PPL CAN GO IN DIRECTLY.

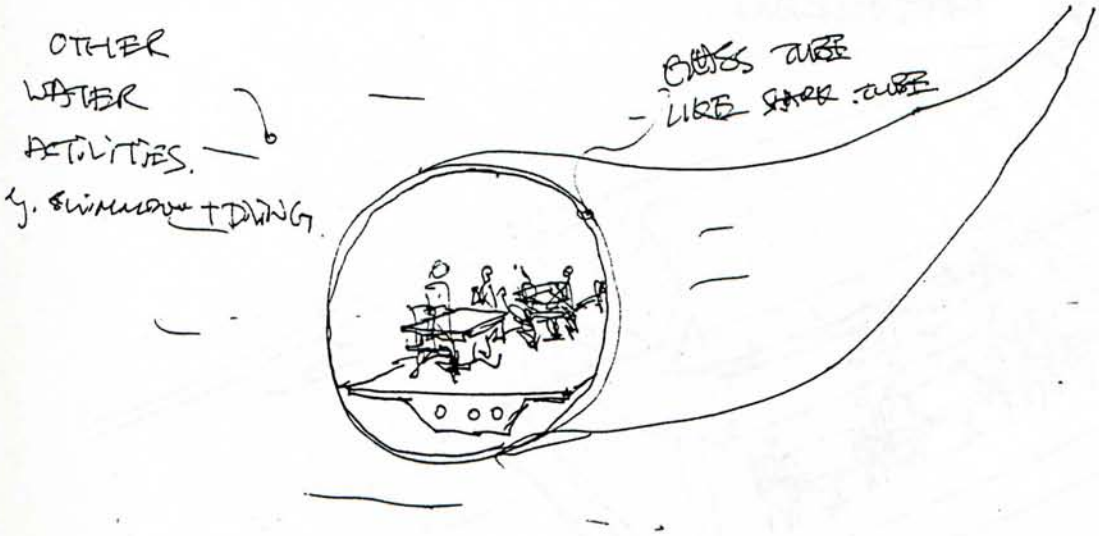


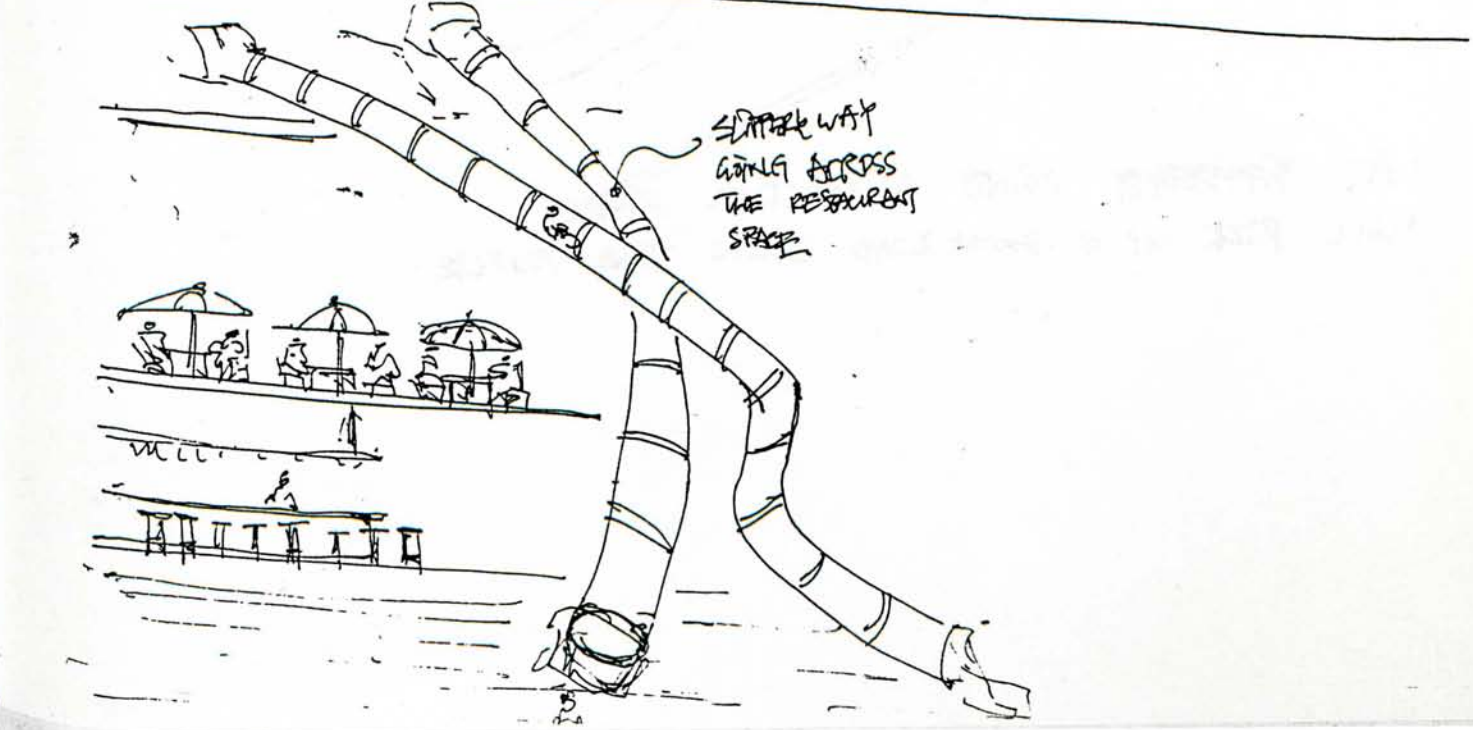




SWIMMING + OTHER

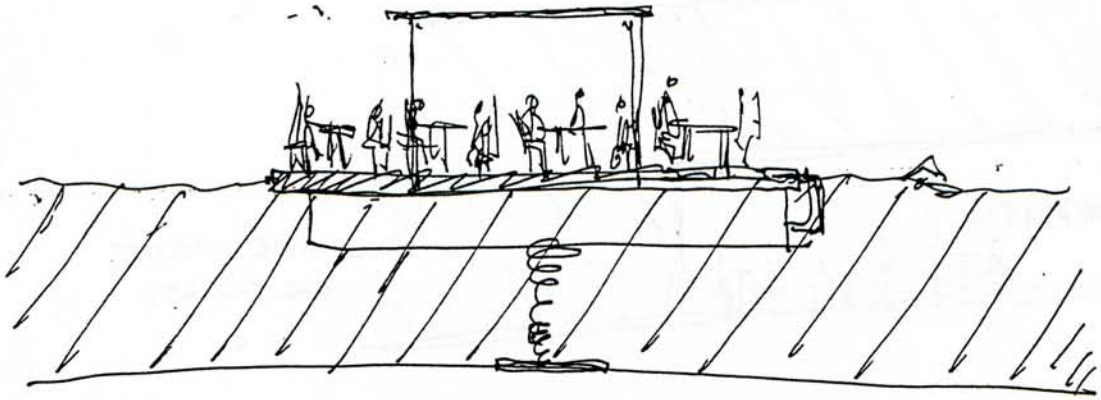




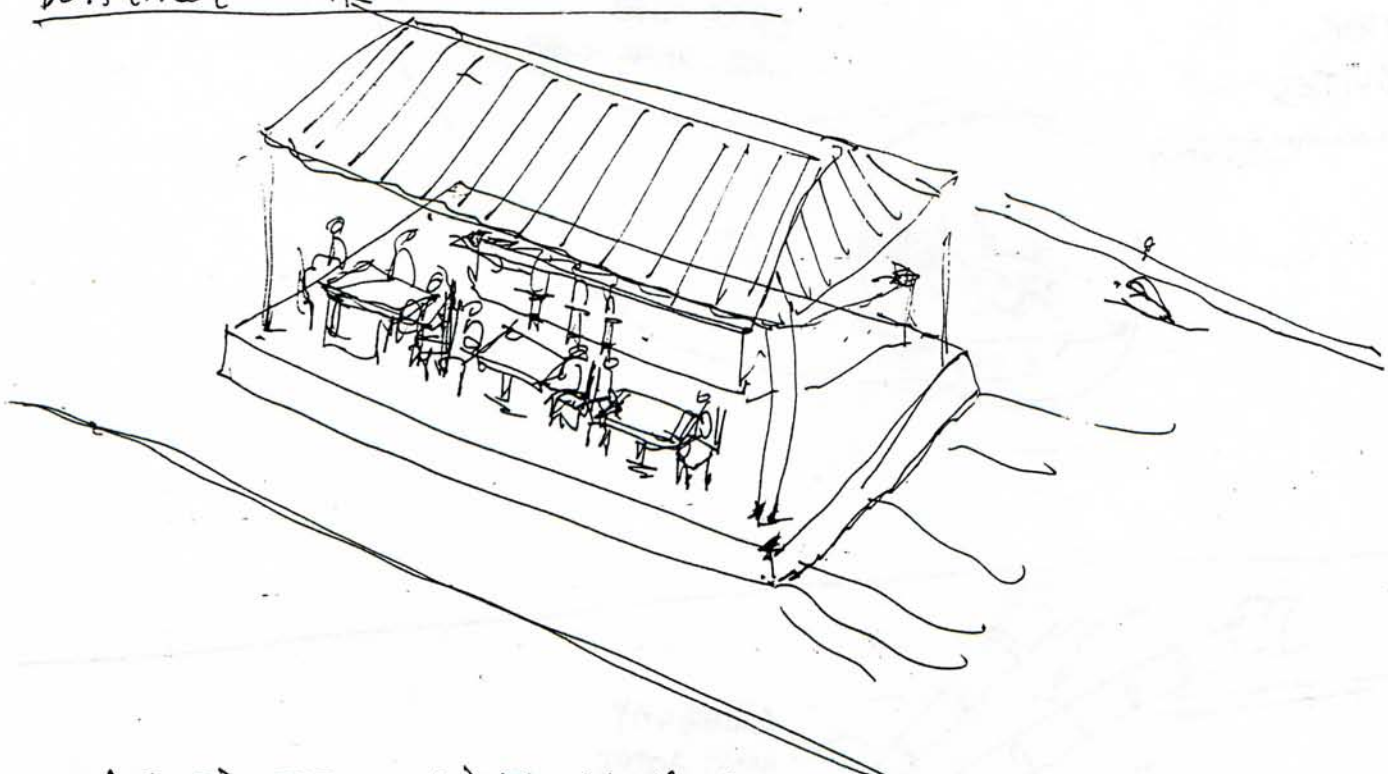


SWIMMING + ~~BATING~~.

FLOATING RESTAURANT.



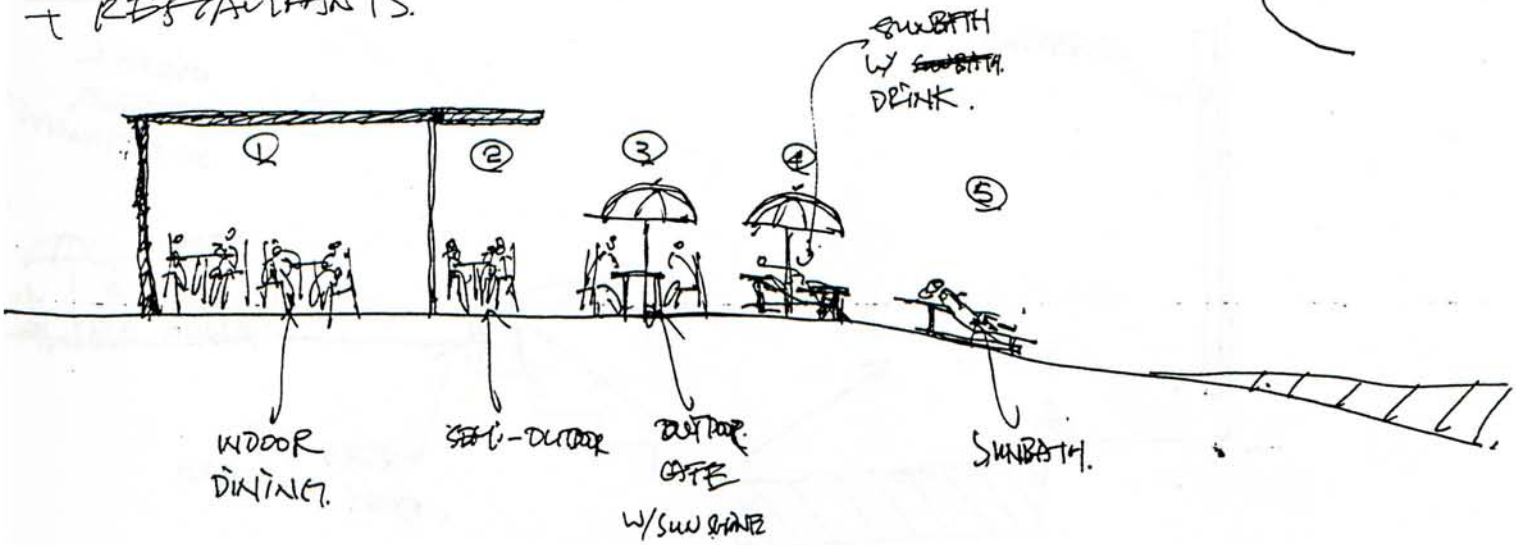
BOATING . LIKE RESTAURANT.



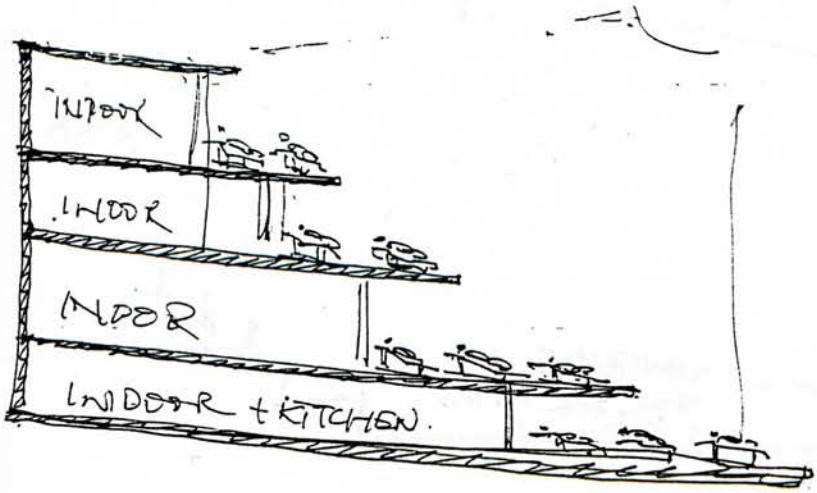
- AT ~~DIFFERENT~~ POINTS ALONG THE RIVER.
- WILL PICK UP & ~~DOWN~~ LOAD DOWN THE PEOPLE.

SUNBATH + OTHER.

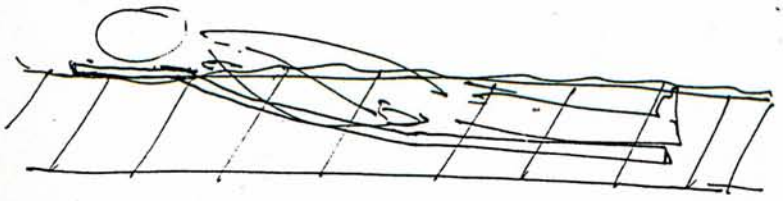
+ RESTAURANTS.



- DIRECTION / ORIENTATION.
- NATURAL ⟷ ARTIFICIAL.
- FOOD ⟷ SUNLIGHT . TURN OUT BOTH ARE ENERGY.



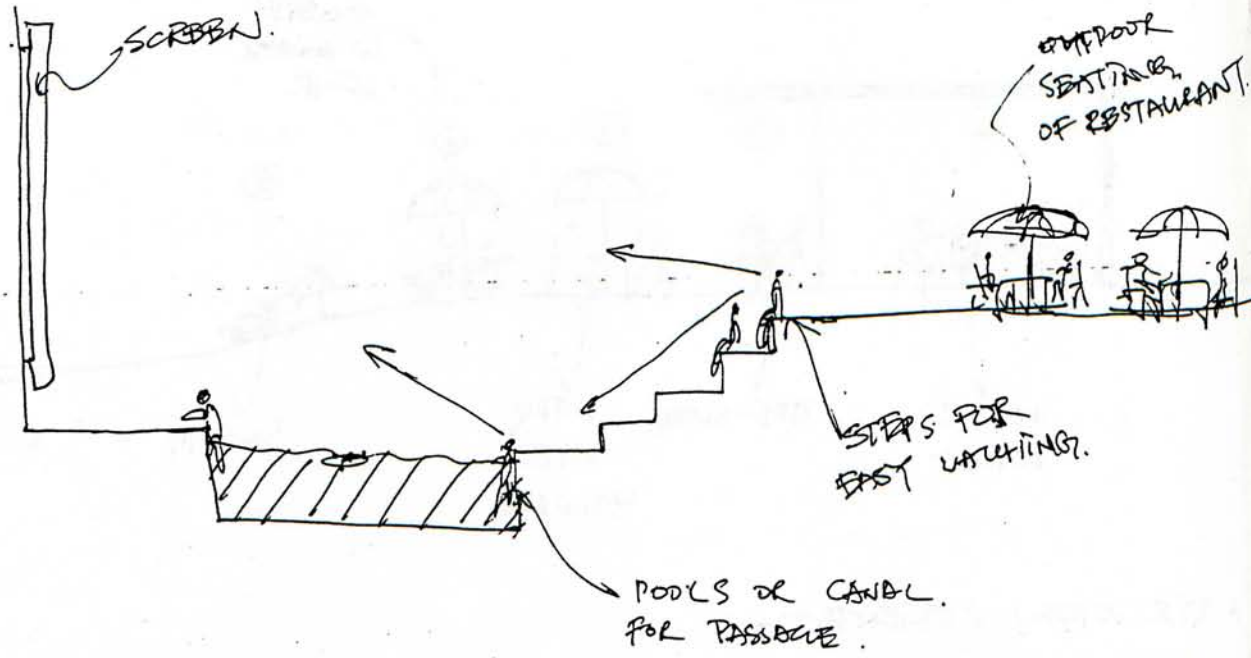
- SUNBATH PLATFORM.
- SUPPORTED BY RESTAURANT.

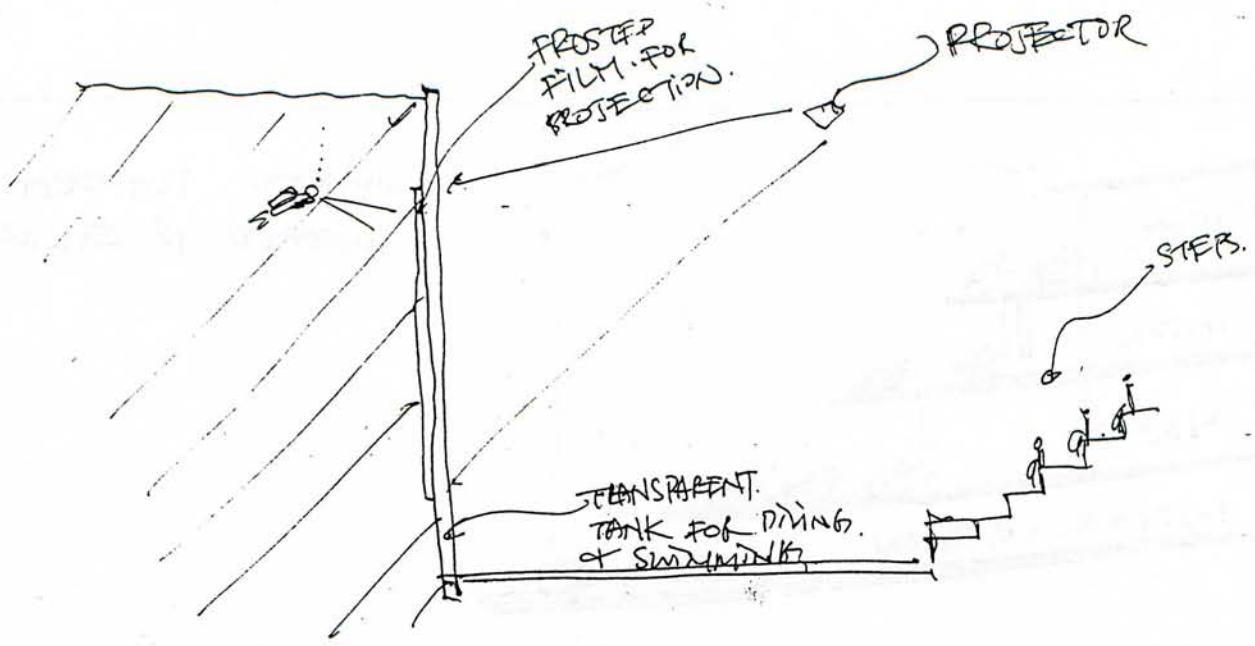


- SUNBATH INSIDE WATER.
- MORE EFFECTIVE.
- COOL DOWN THE BODY.

SWIMMING + OTHERS.

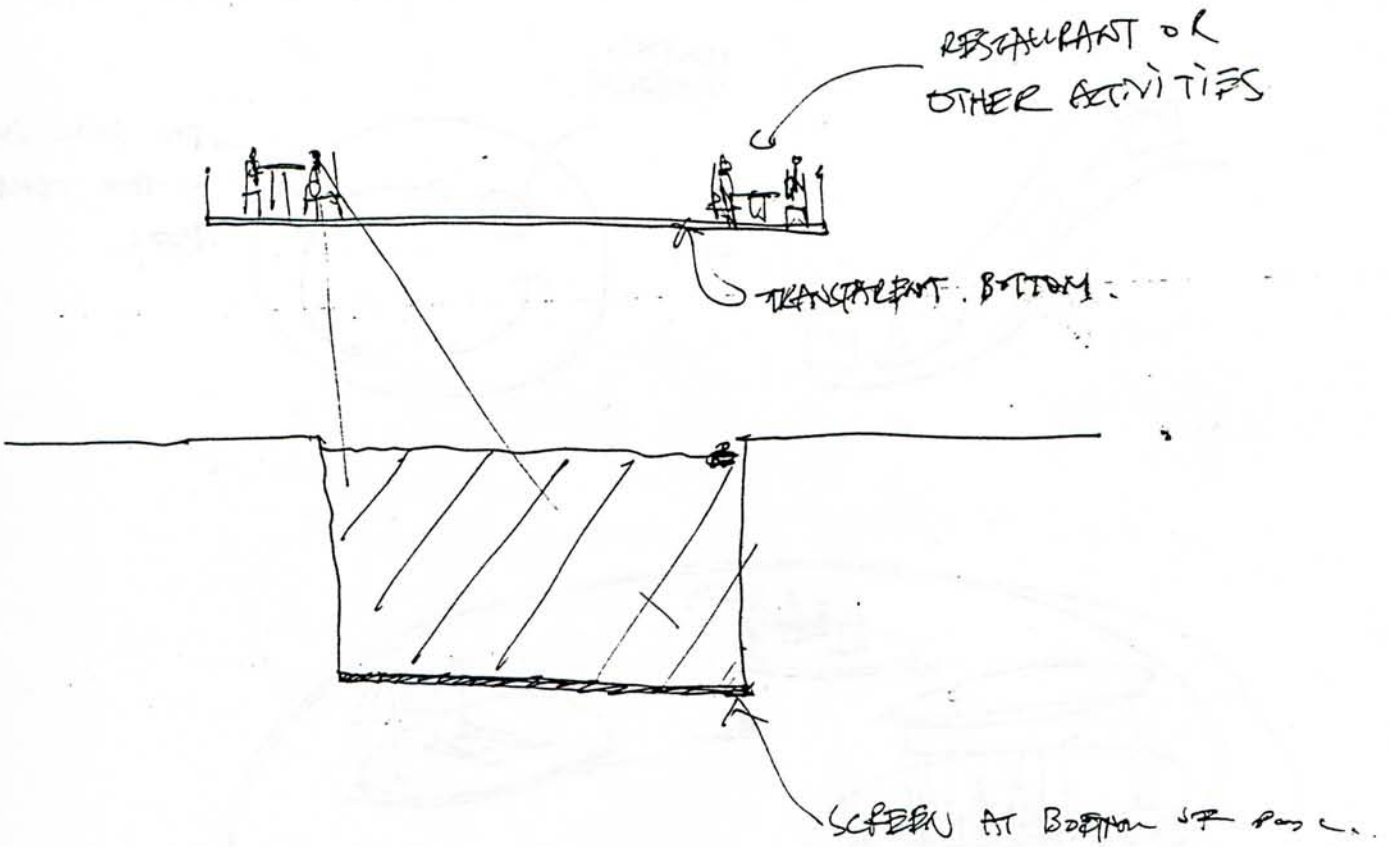
+ MOVIE.

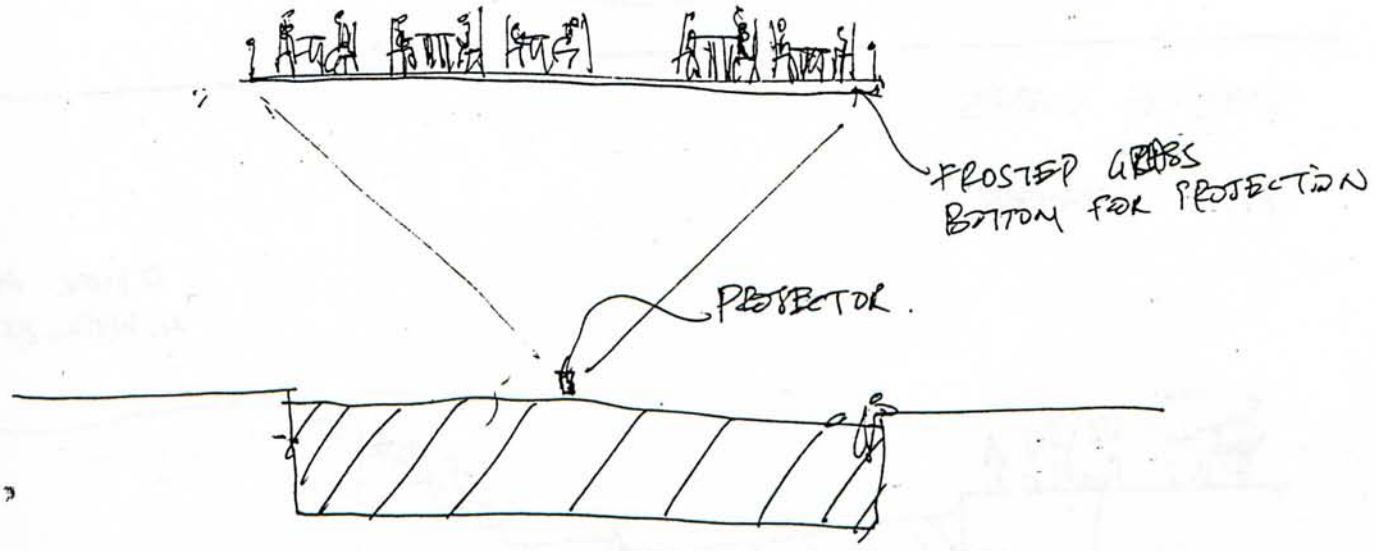




· FILM IS SEEN FROM BOTH SIDES

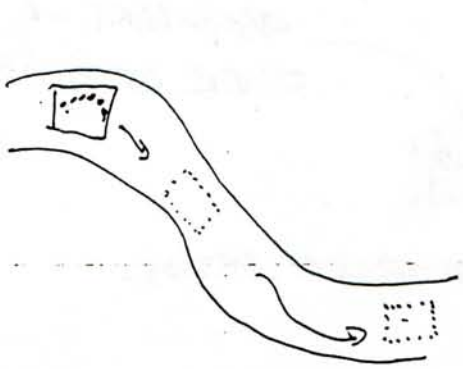
SWIMMING POOL + MOVIES



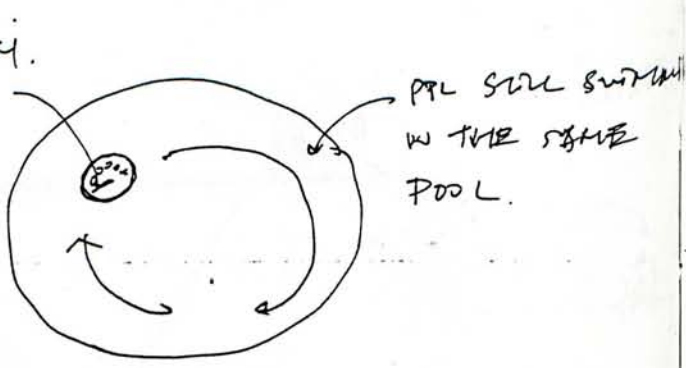


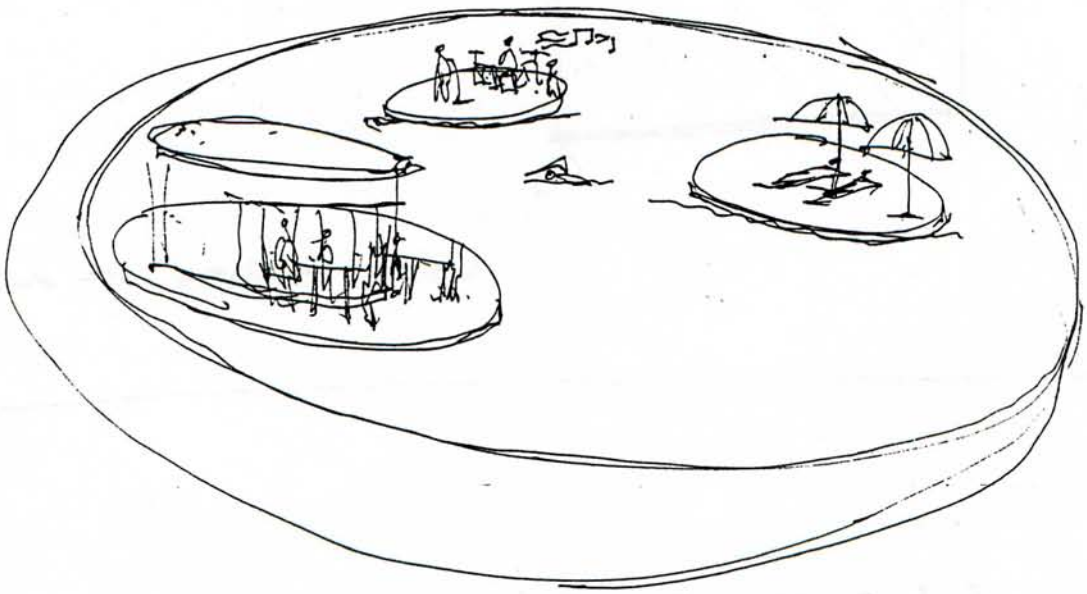
SWIMMING + PERFORMANCE STAGE

- FLOATING PLATFORM. PERFORMANCE. MOVING AROUND



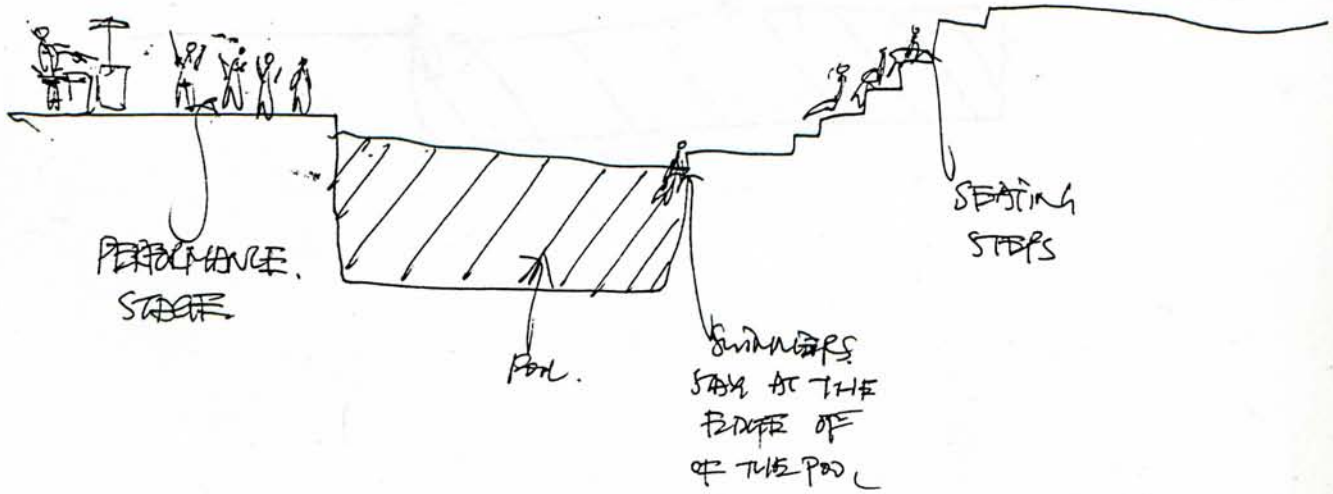
or.



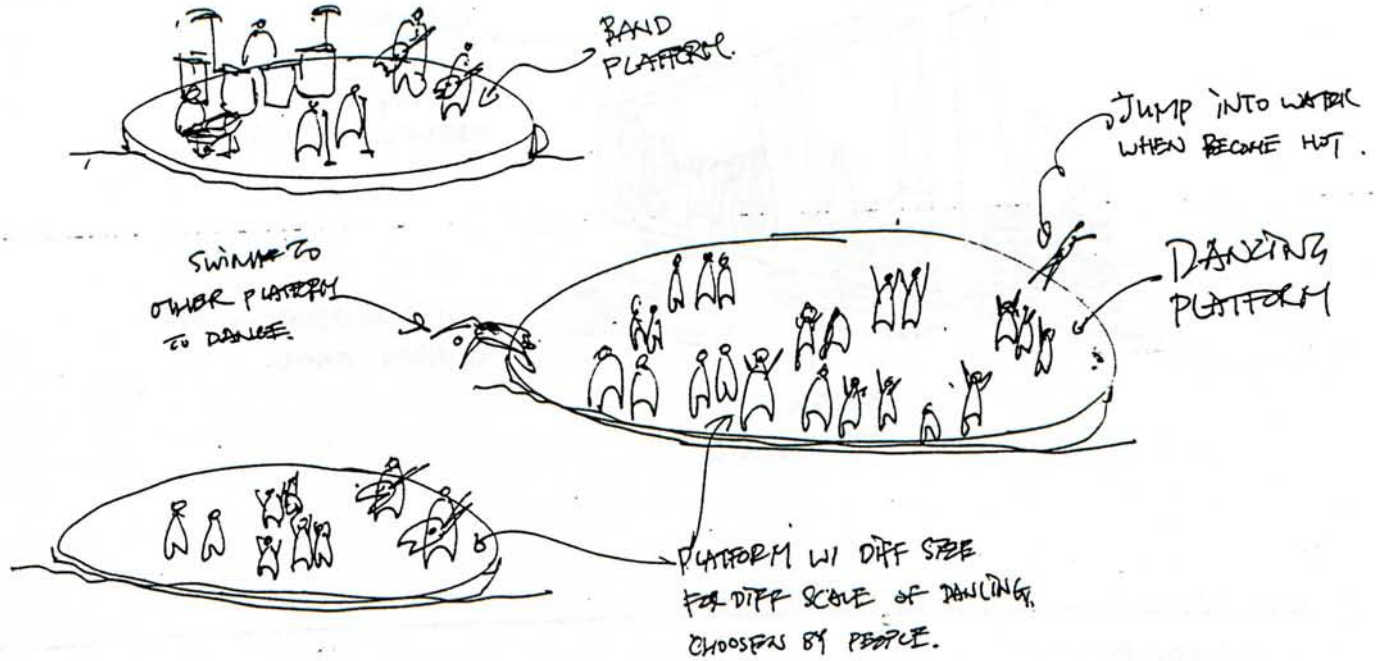


SEATING STEPS + POOL WATCHERS.

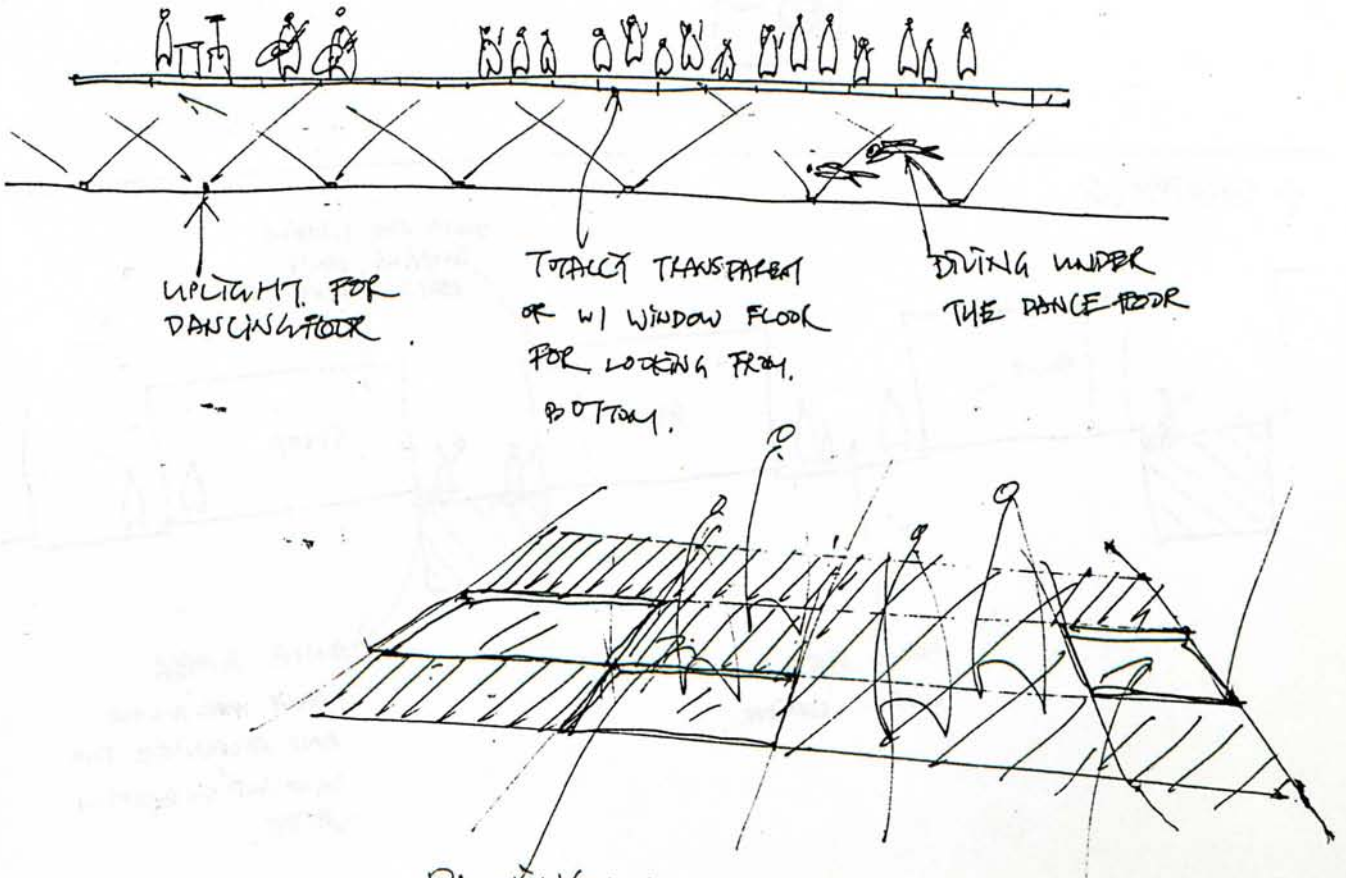
OTHER ACTIVITI
e.g. WATER AREA.



SWIMMING & DANCING & MUSIC PERFORMANCE.



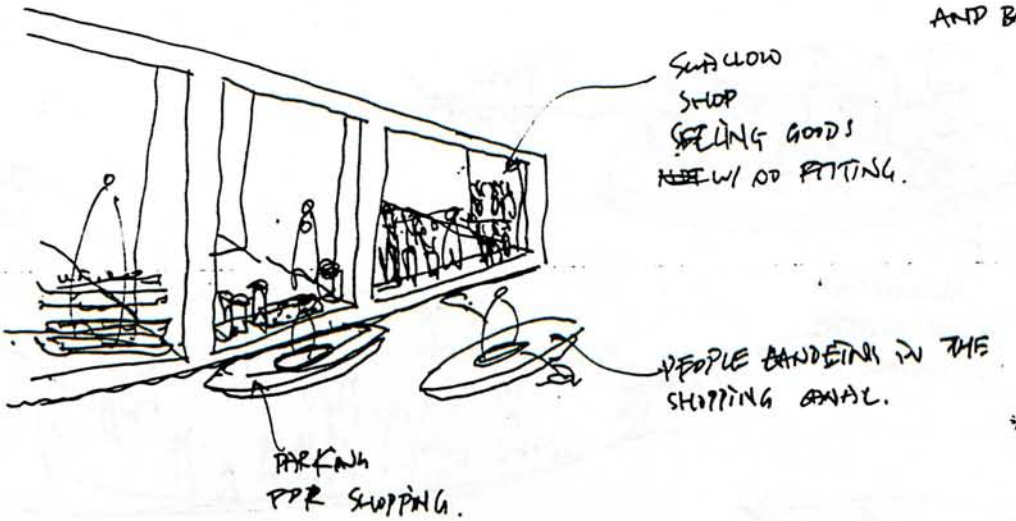
DIVING UNDER DANCE FLOOR



CANOEING + OTHERS

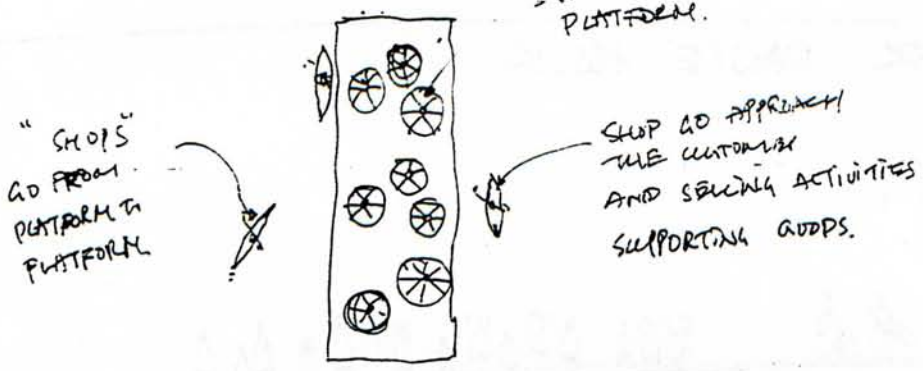
+ SHOPPING.

- CANOEING IS GOOD IN EASY CONTROLING. TURNI AND BACK & FORWARD.

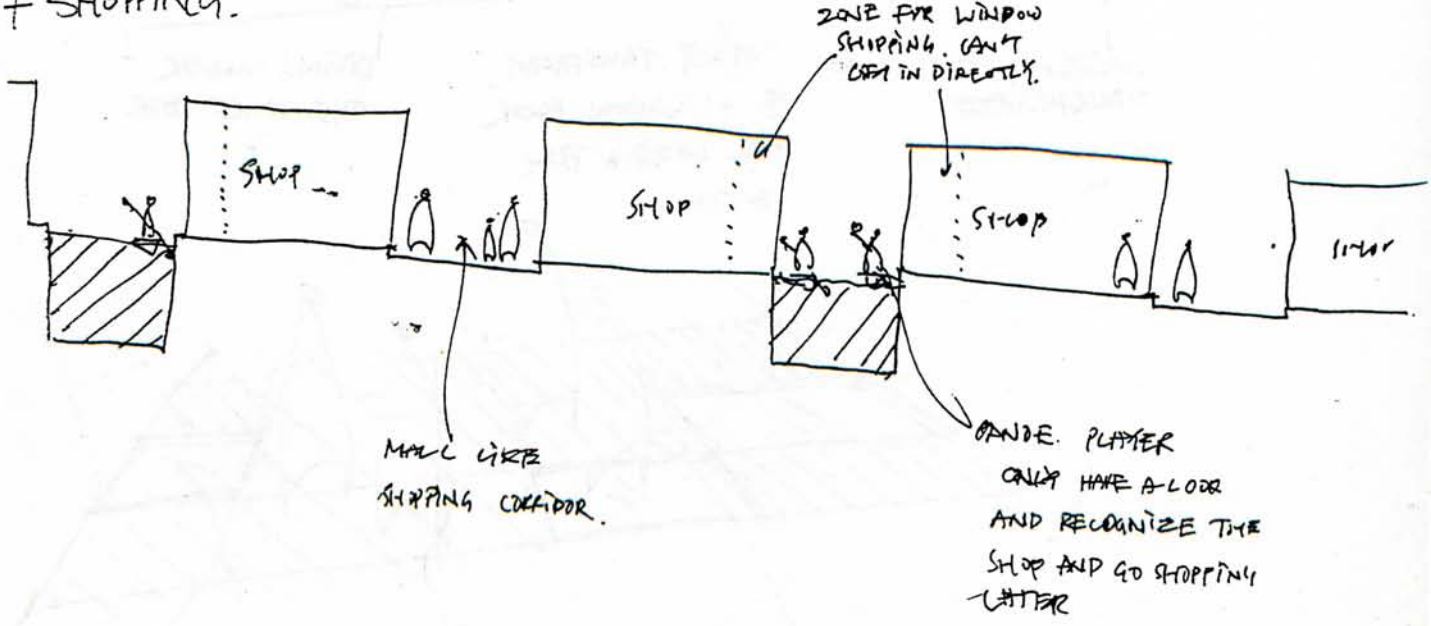


+ SHOPPING.

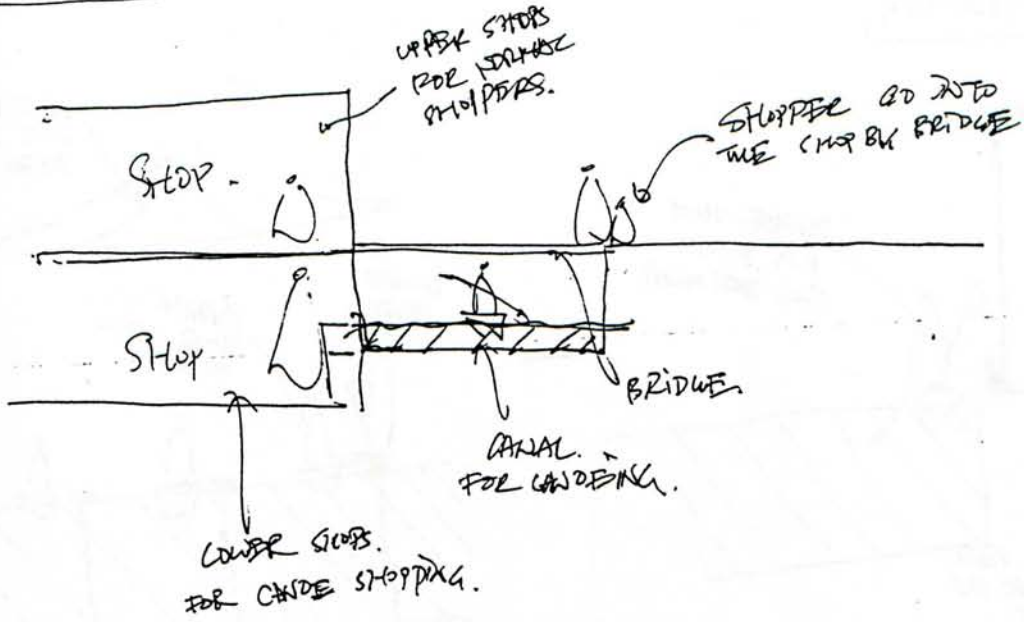
- SHOP IS MOVING TOWARD THE CUSTOMERS.



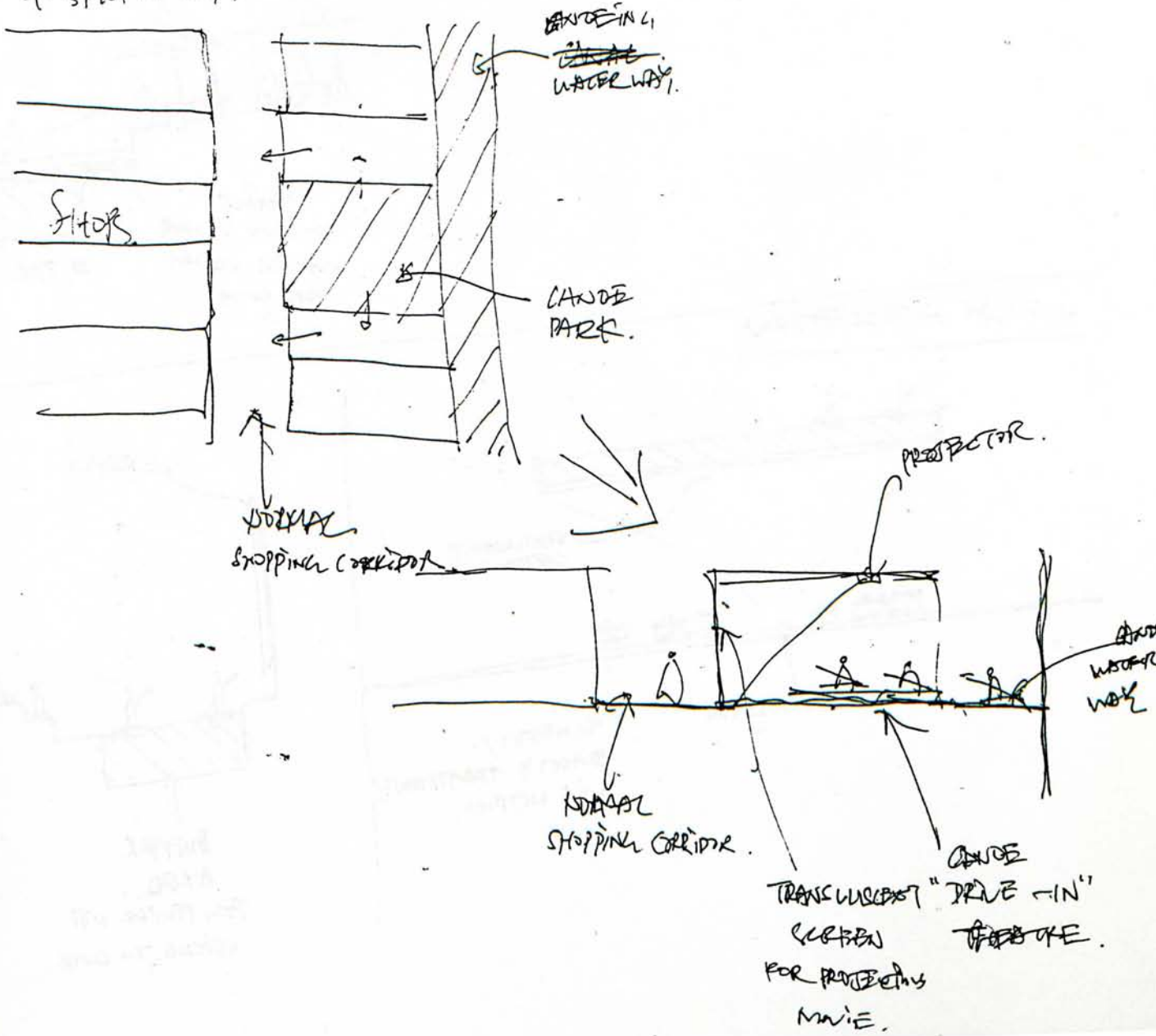
+ SHOPPING.



CANOEING + SHOPPING.

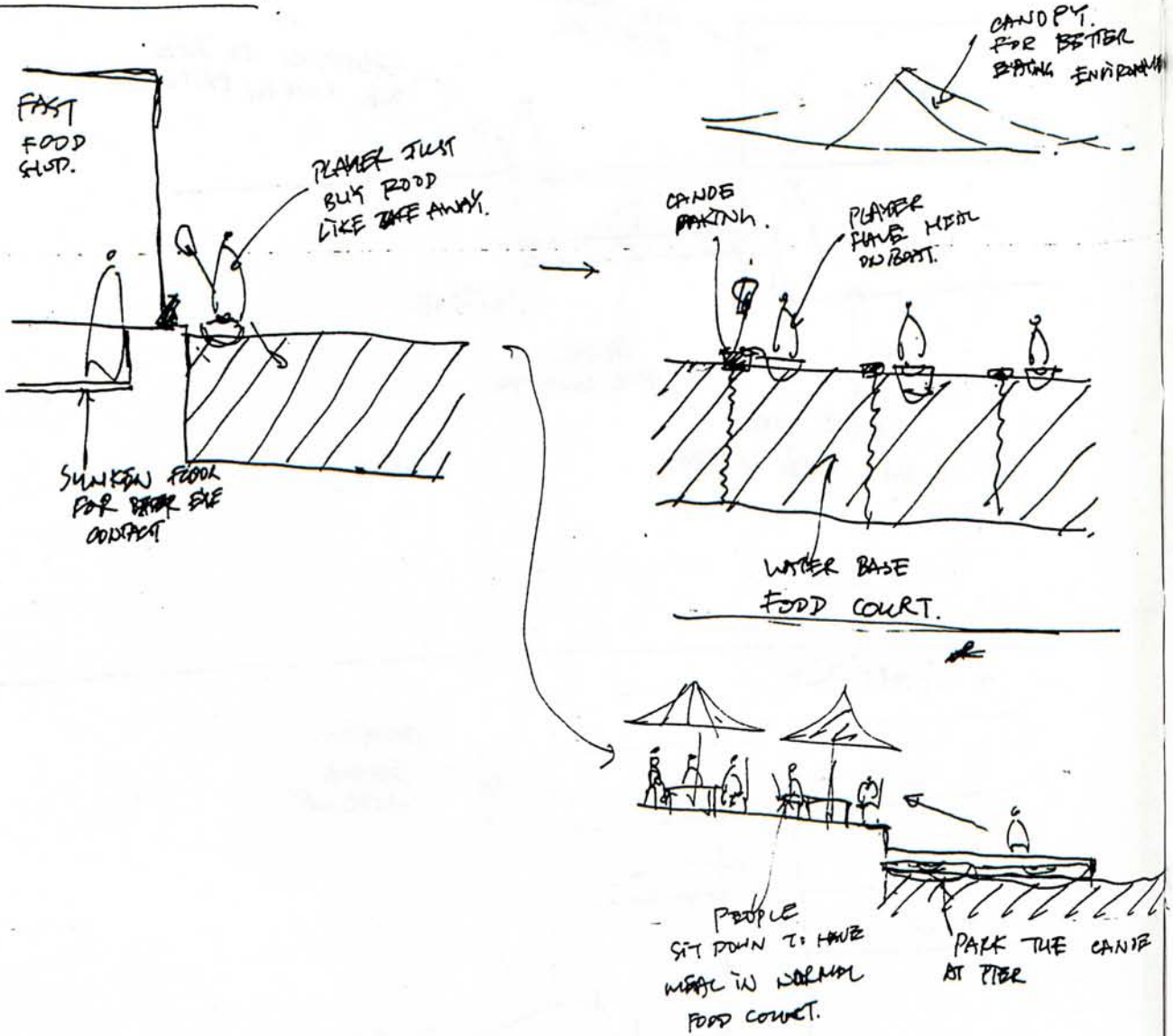


+ SHOPPING.

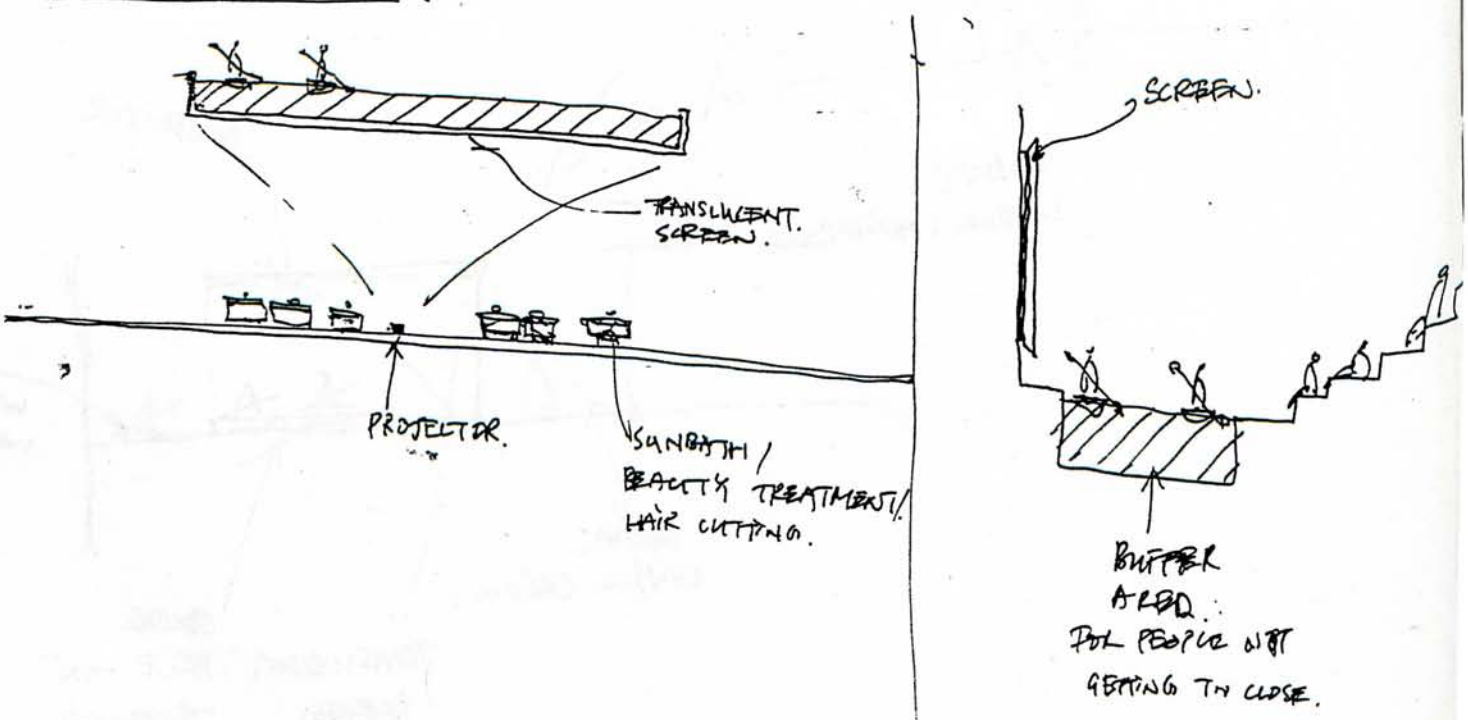


CANOEING + OTHERS

+EATING + SHOPPING.

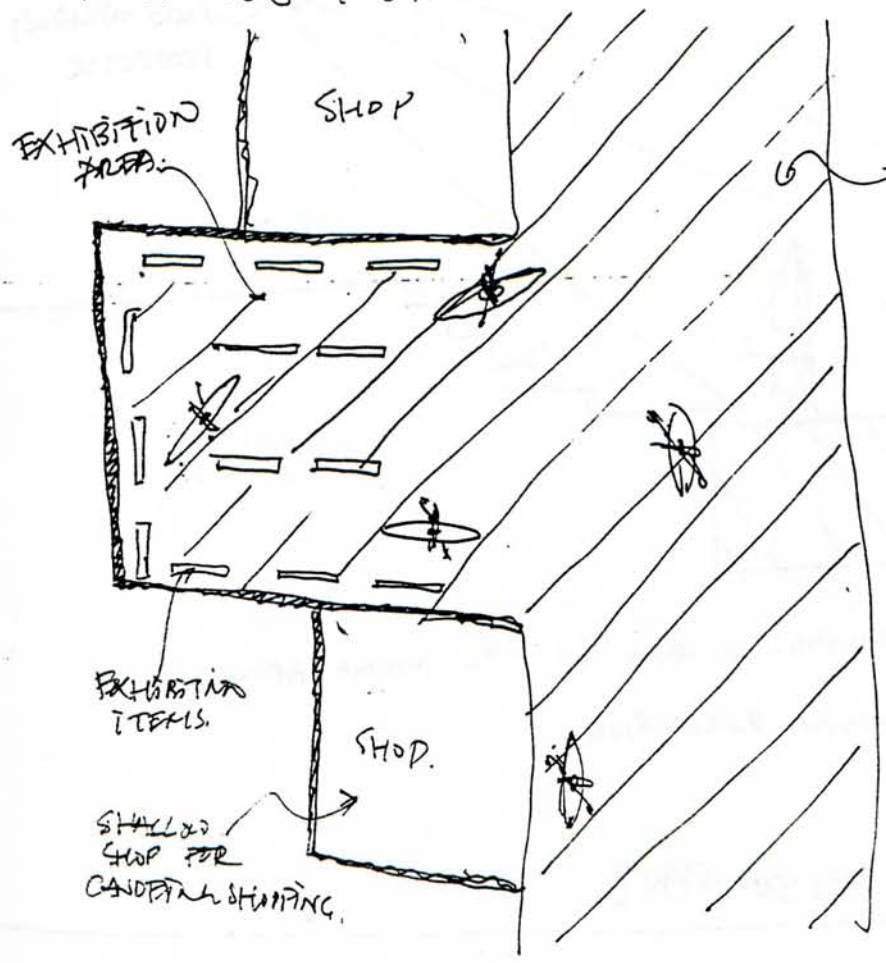


+FILM APPRECIATION



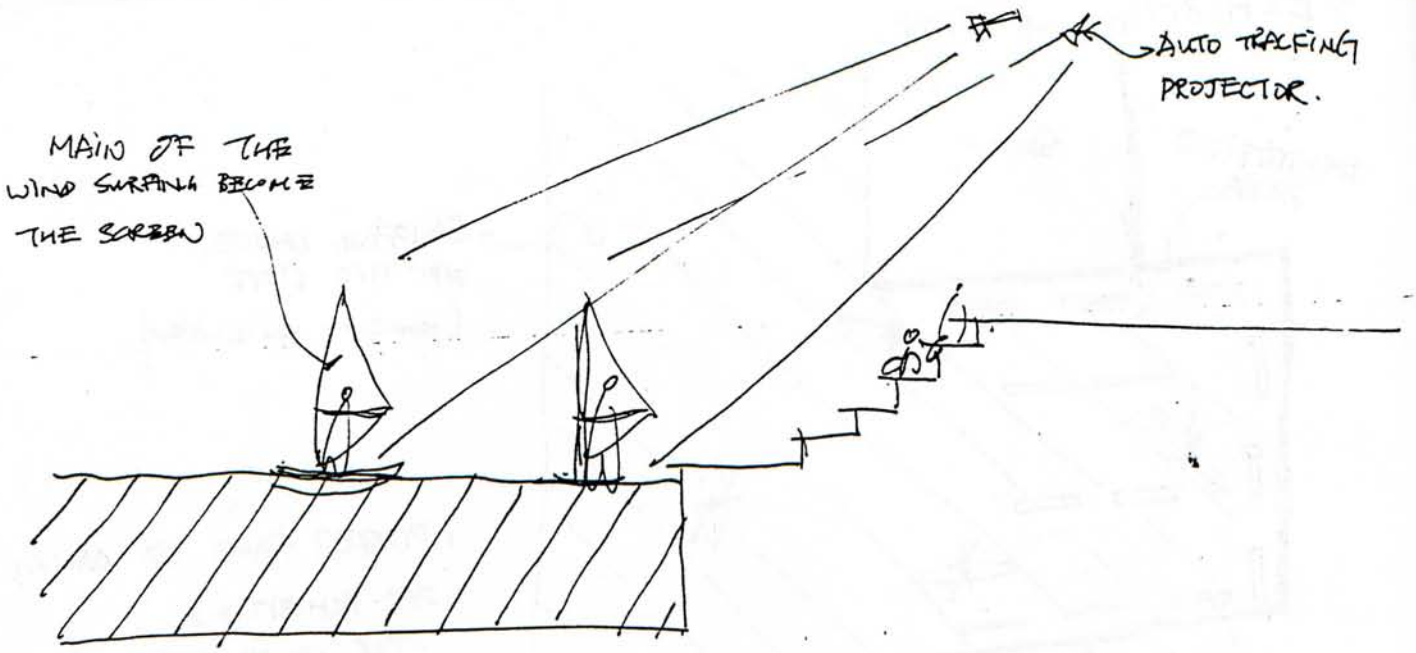
CANOEING + OTHERS.

+ EXHIBITION + SHOP.



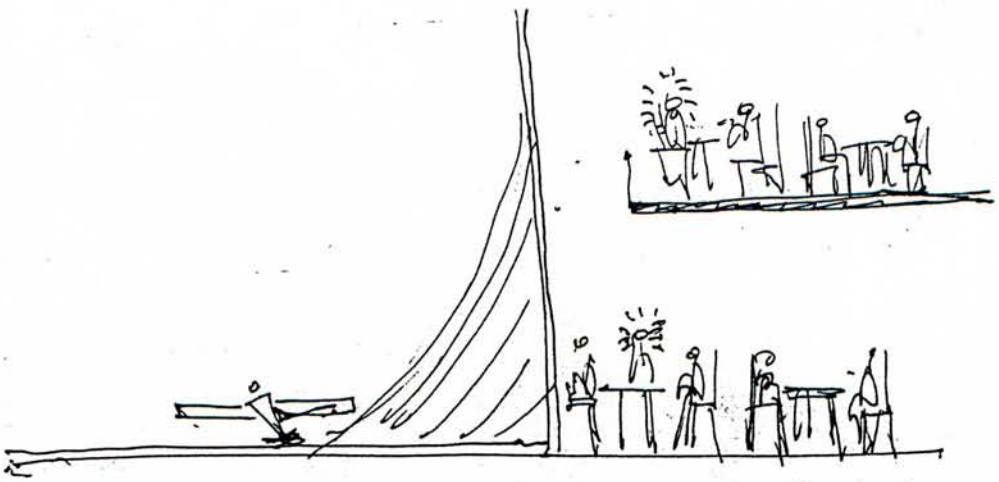
- POCKET SPACE OF CANAL.
  FOR EXHIBITION.
  - FOR CANOE PLAYER. IT IS GOOD TO HAVE SOME DIFFICULT PT TO RIDE.
  - FOR EXHIBITION, IT DRAW PPL IN.
- PROBLEM OF CHANING EXHIBIT AND MAINTAINANCE.

WIND SURFING + EXHIBITION.



- EXHIBITION ITEM MOVING INSTEAD OF PPL MOVING AROUND
- EASY EXHIBITION - ALLOW OVERLAPPING

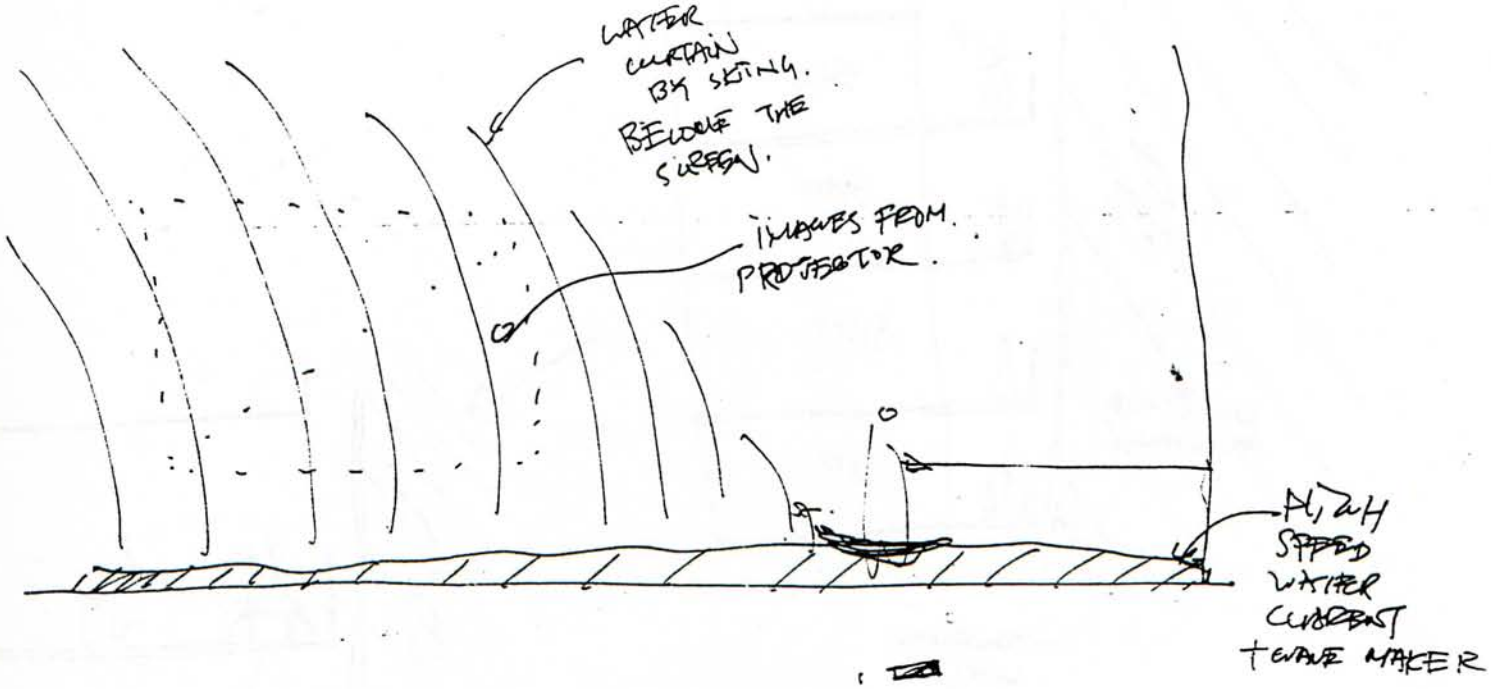
WATER SKIING + RESTAURANT

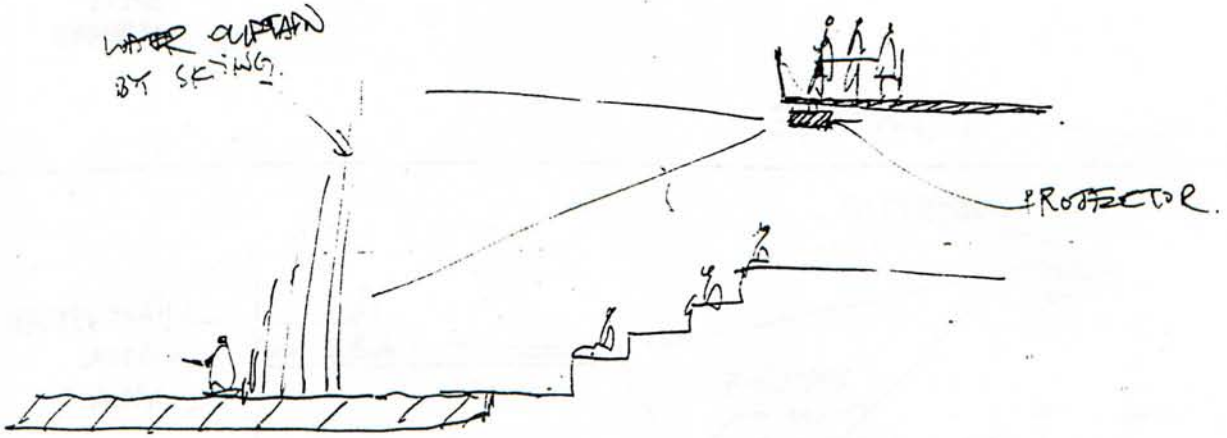


- THE HIGH WAVE WILL HIT ON THE WINDOW.
- WHEN THE PLAYER IS GOOD AND CAN MAKE INTERACTION. BETWEEN THE ~~RATER~~ + PLAYER.

ATER SKIING. + OTHERS.

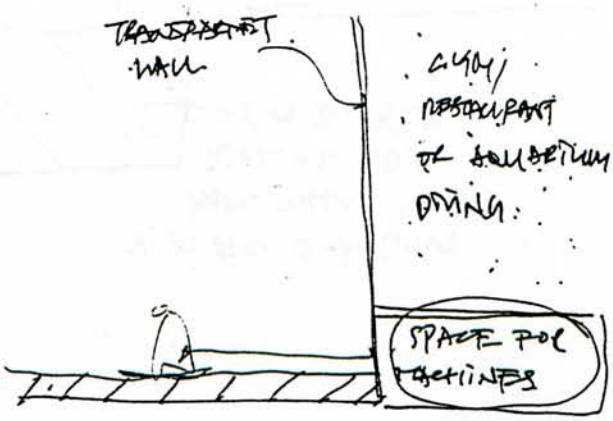
+ FILM APPRECIATION.





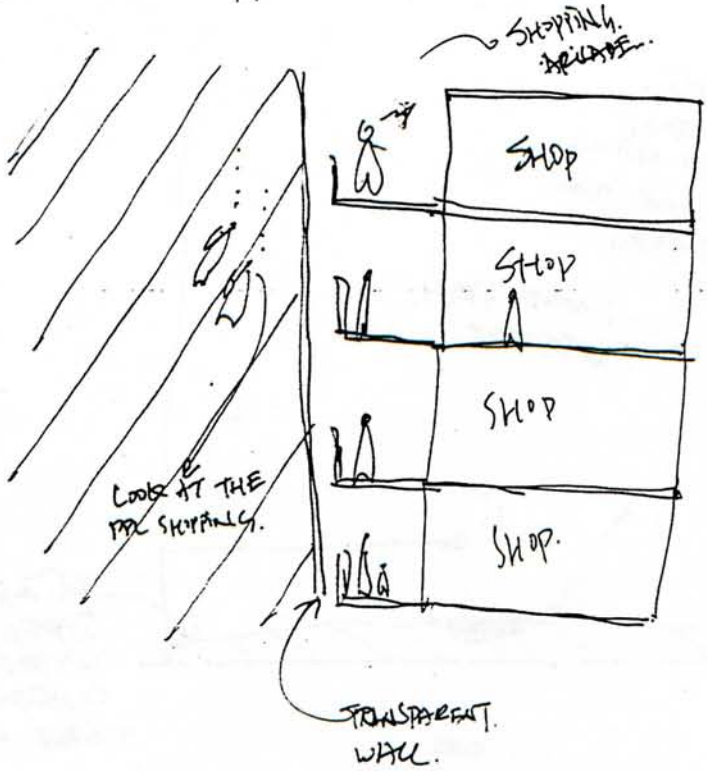
+ FILM. APPRECIATION.

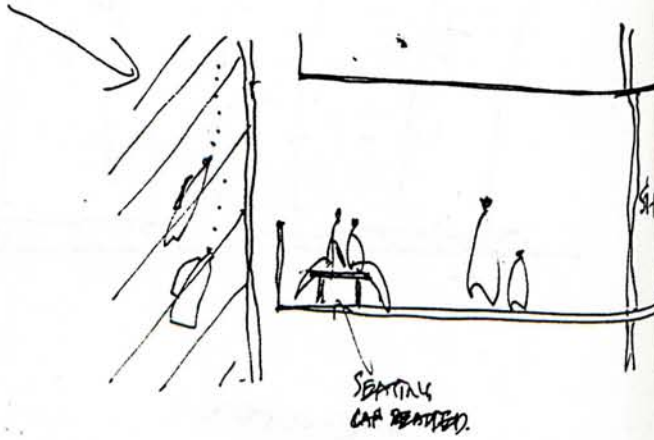
+ GYM / RESTAURANT / AQUARIUM.



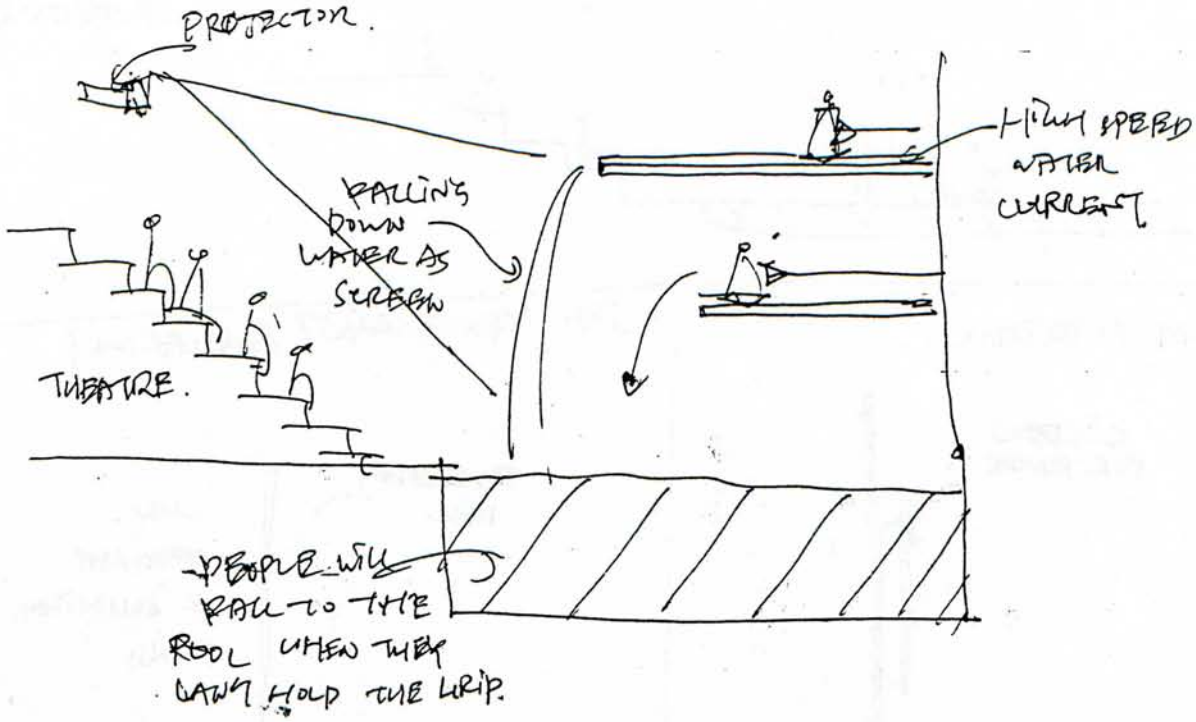
SCUBA DIVING + OTHERS

+ SHOPPING.



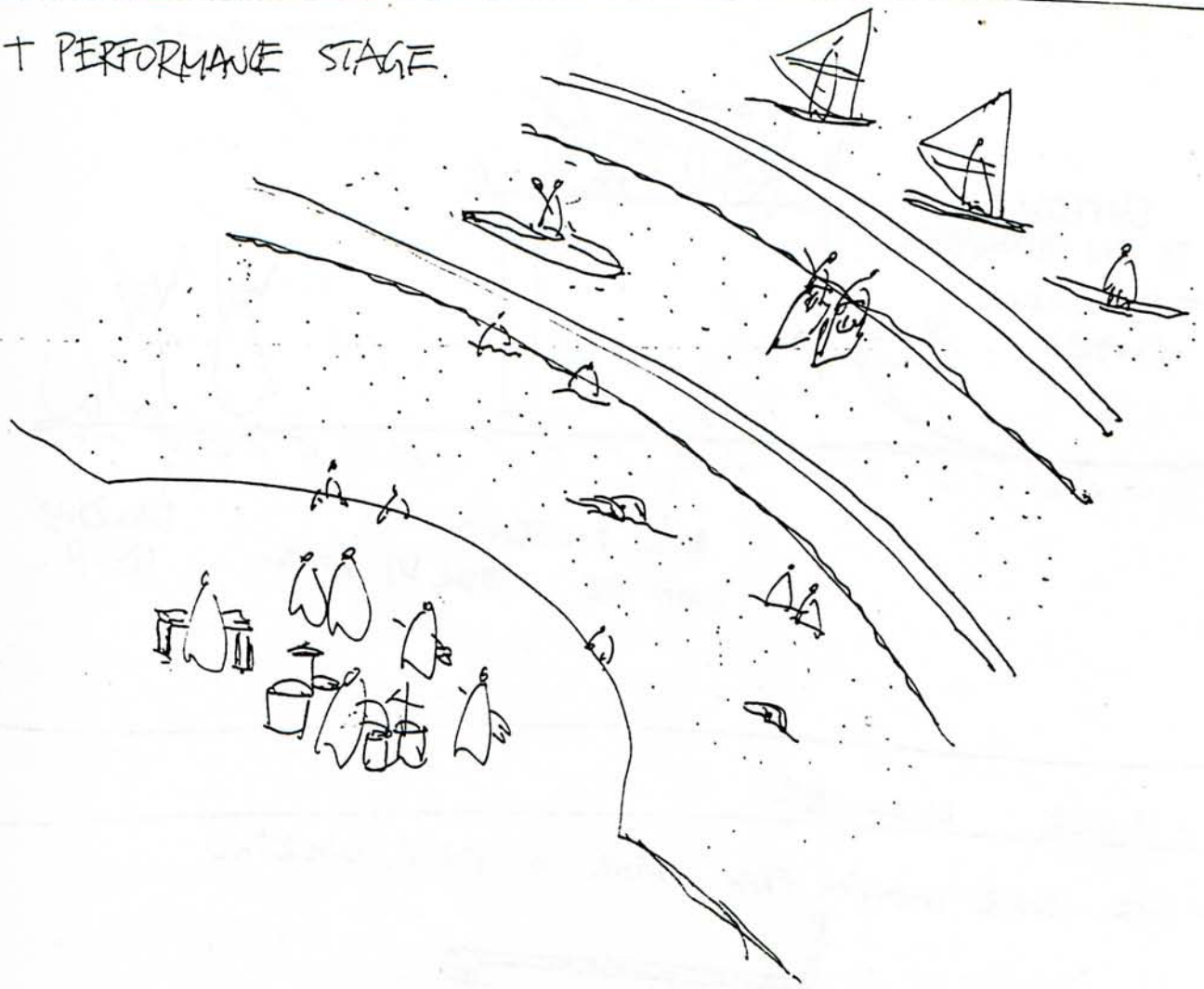


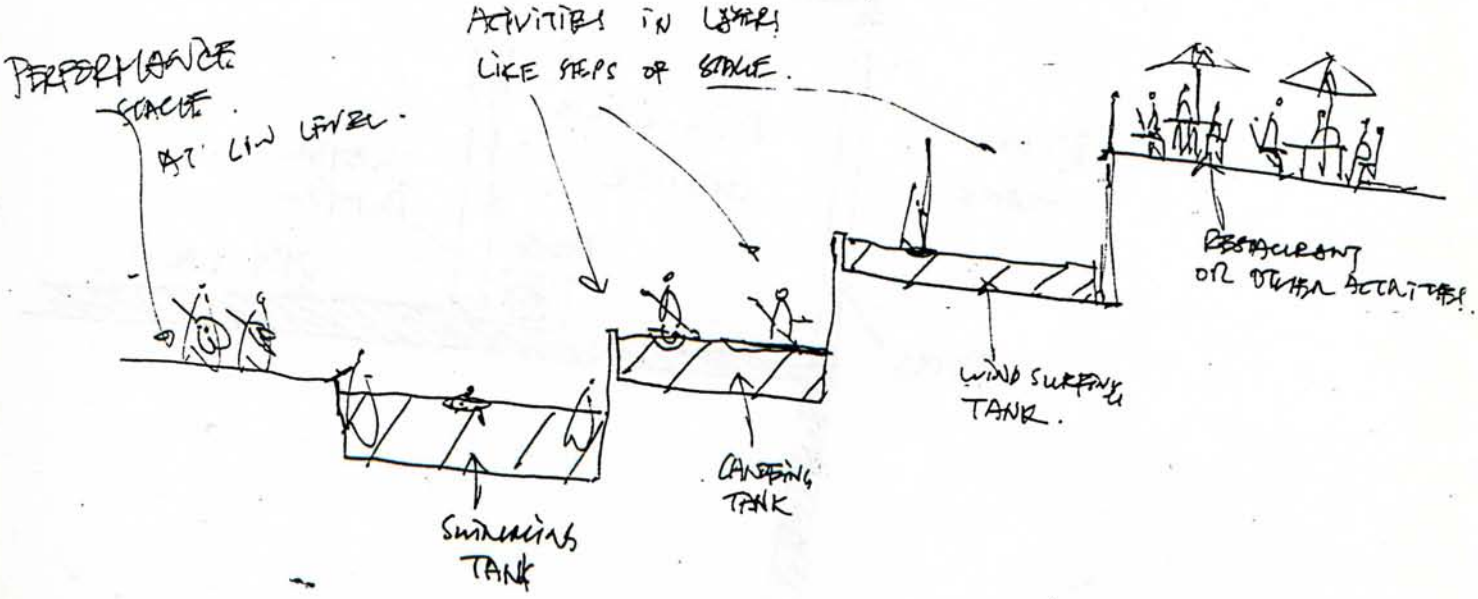
SKIING + THEATRE



MIXED WATER SPORT + OTHERS

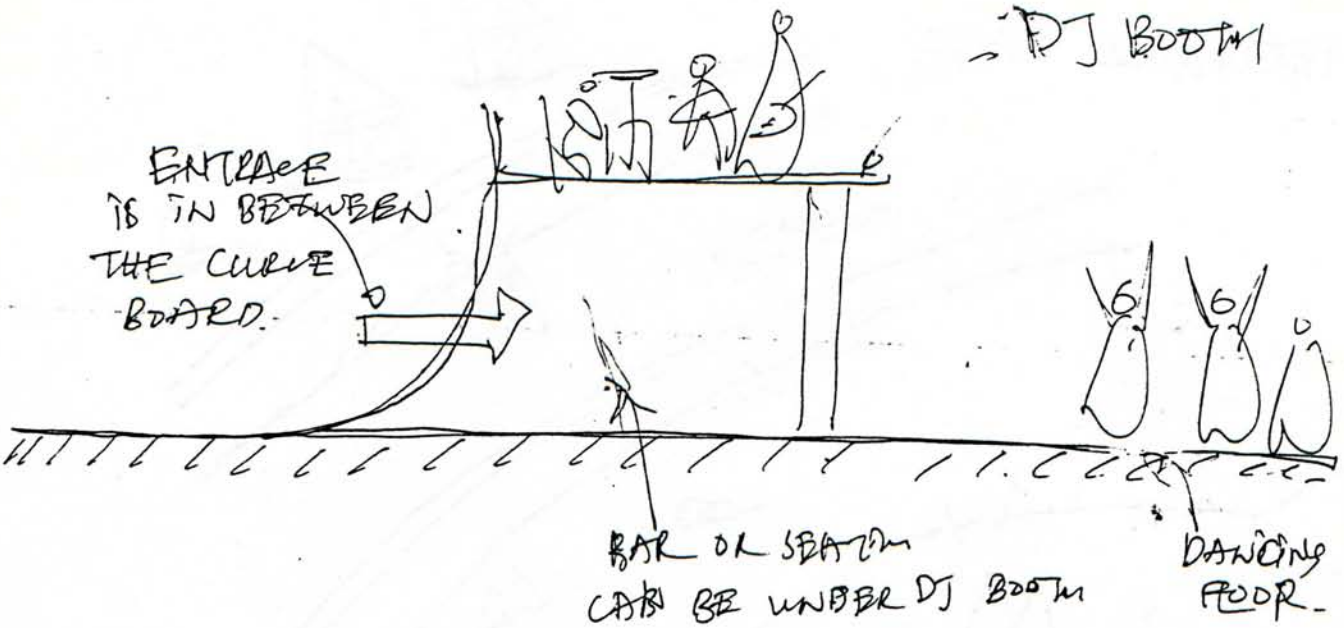
+ PERFORMANCE STAGE.





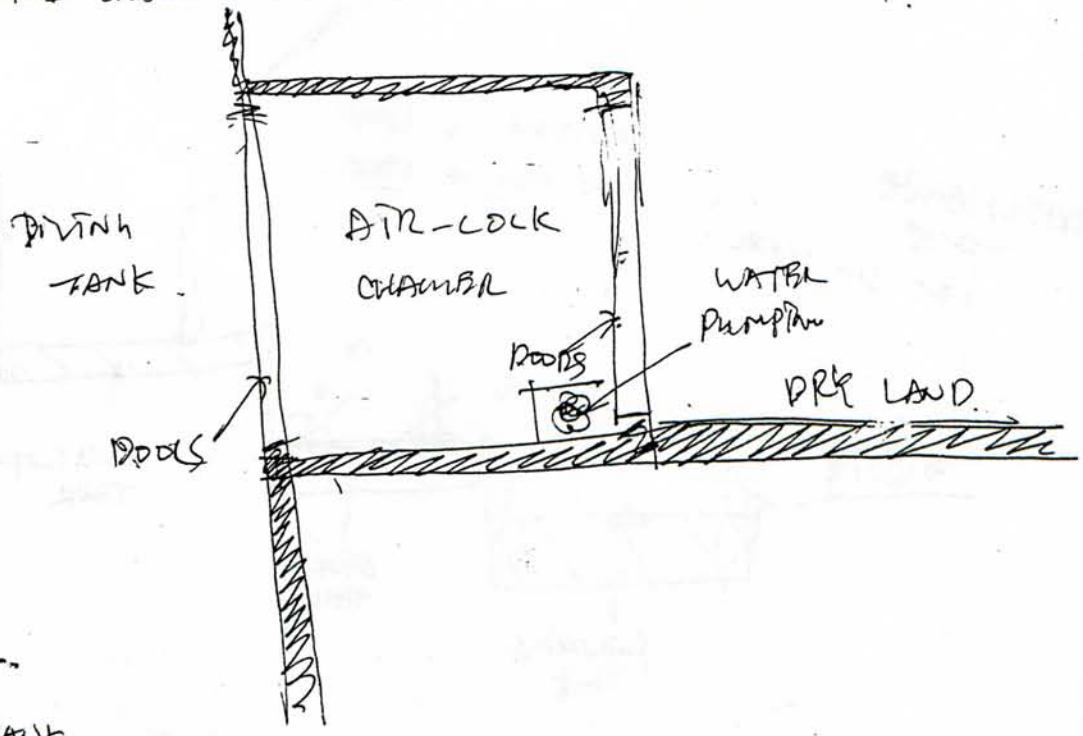
- PERFORMANCE STAGE CAN BE CHANGED TO - RESTAURANT.
- FILM PROJECTION.

SURFING + DANCING FLOOR.

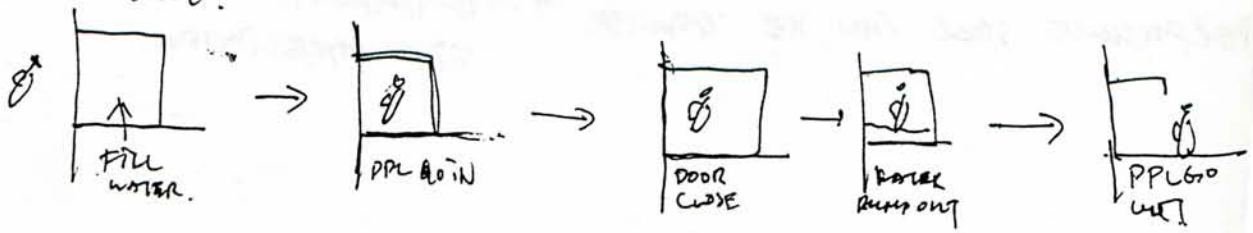


AIR - LOCK CHAMBER.

- FOR PEOPLE CHANGING FROM DIVING to DRY. WALKING.



① GO OUT TANK.



Combination Sketches

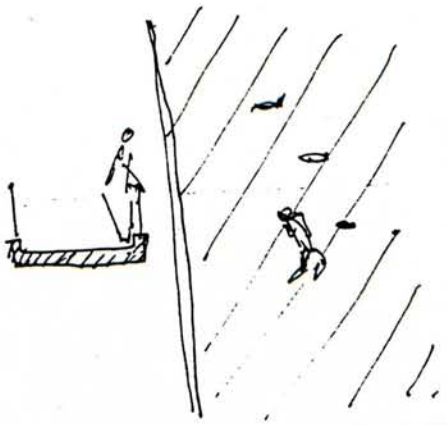
Failed idea

The reason of failure is usually just putting the activities together without the meaning of hybridity. And another reason is the combination is too large or for other reason cannot fit in the urban site.

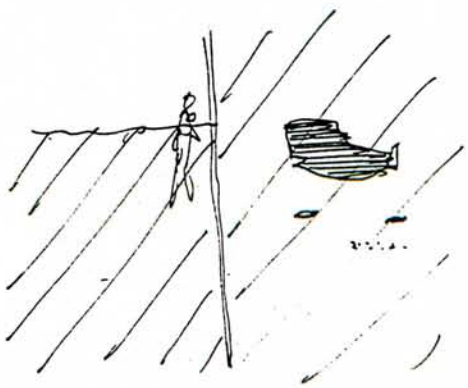
SWIMMING + OTHERS

+ AQUARIUM.

1. ADDING FISH TO THE SWIMMING / DIVING POOL.



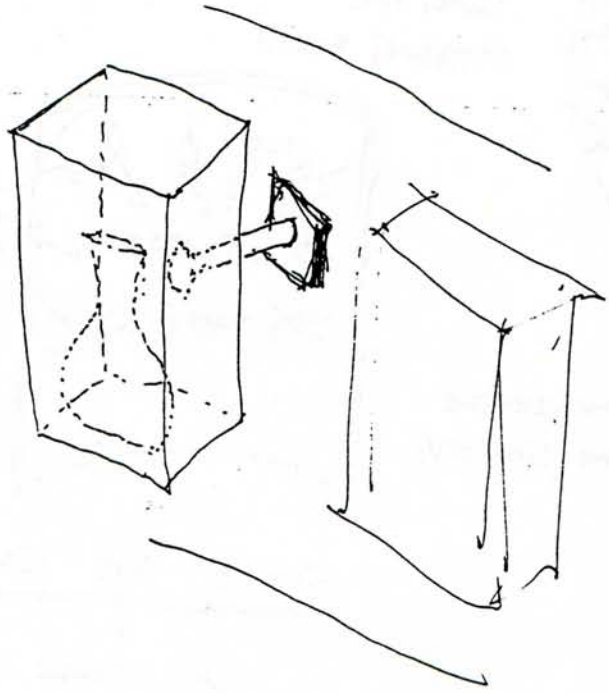
2. SWIMMERS / DIVERS ARE THE HATCHER OF THE AQUARIUM.

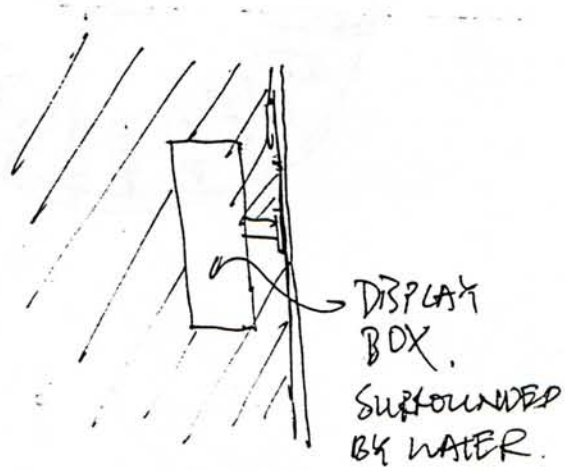


SWIMMING + OTHERS

-EXHIBITION.

• BREAK THE VIEW OF APPRECIATION THE DISPLAY OBJECT.
TOP / BOTTOM VIEW BEYOND JUST EYE LEVEL.

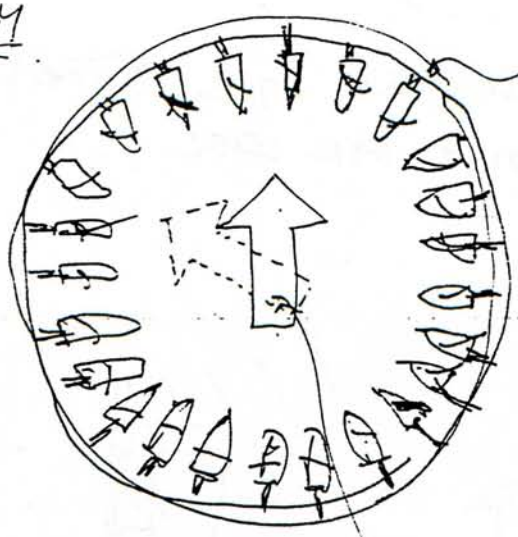




• MOVING ITEMS ~~AS~~ ~~EX~~ CARRY THE ~~E~~ EXHIBITED OBJECTS.

WIND SURFING + OTHERS

+ GYM



CYLINDRICAL TO HAVE ALL DIRECTIONS OF WIND/ FOR DIFFERENT BOARDS

COMPUTERIZE WIND SIMULATOR.

DIFF LAYERS HAVE DIFF EQU

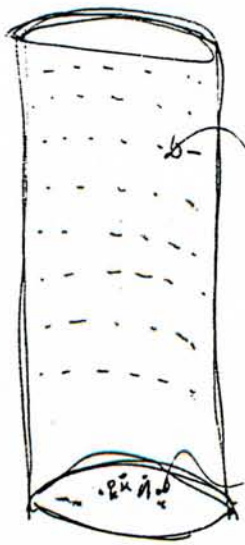
EQUIPMENT OF 5
- BICYCLE
- 划船机.

SHARE THE "WIND"

↓

COOL DOWN.

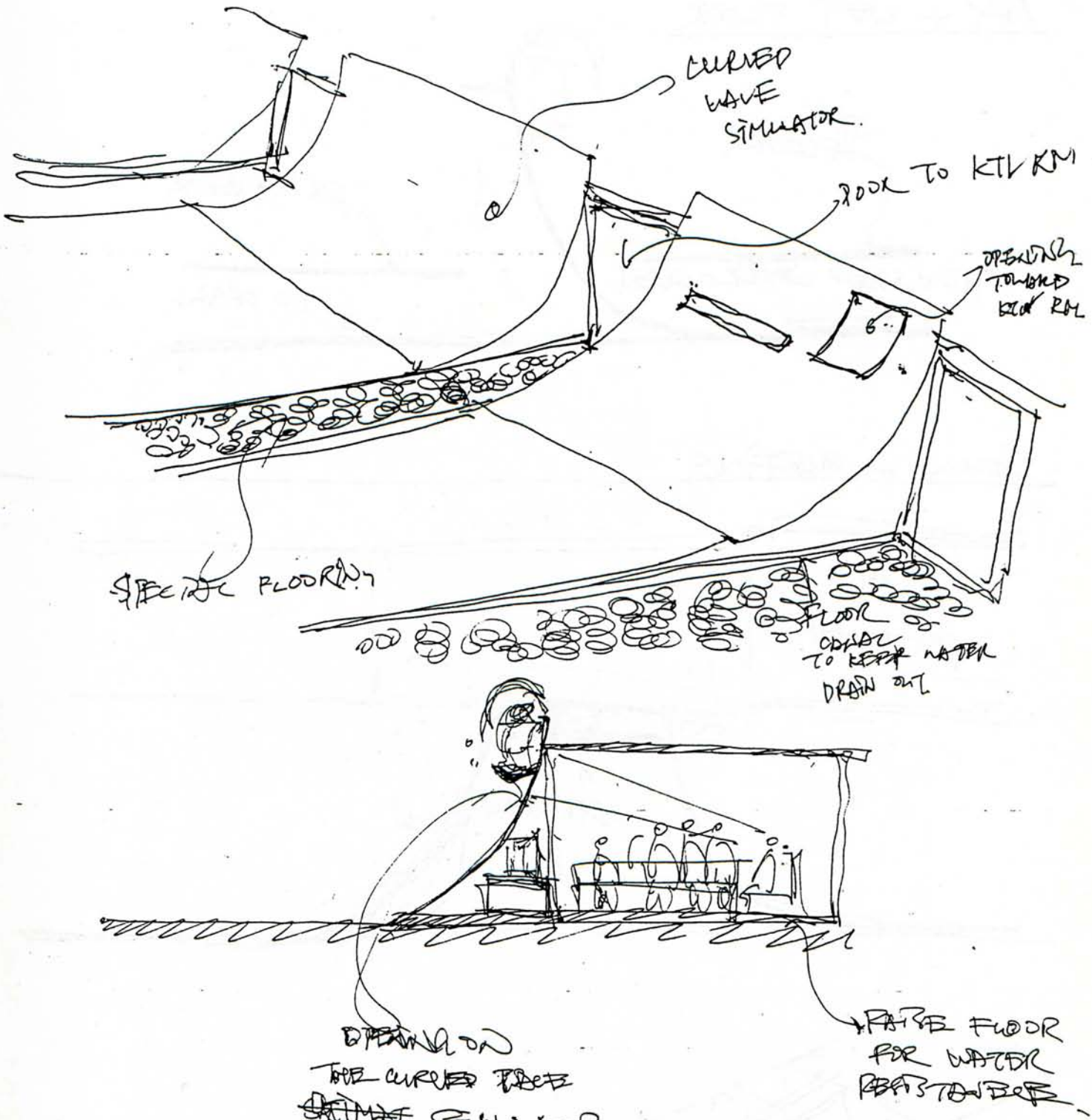
+ WAITING ~~AREA~~



GYM EQUIPMENT

WAITING PLAZA. AT GF.

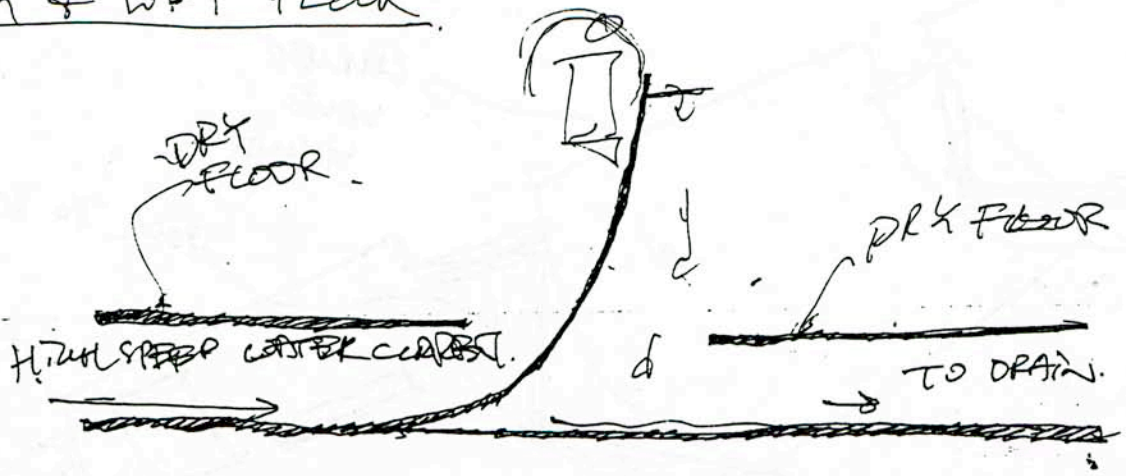
SURFING + KTV RM



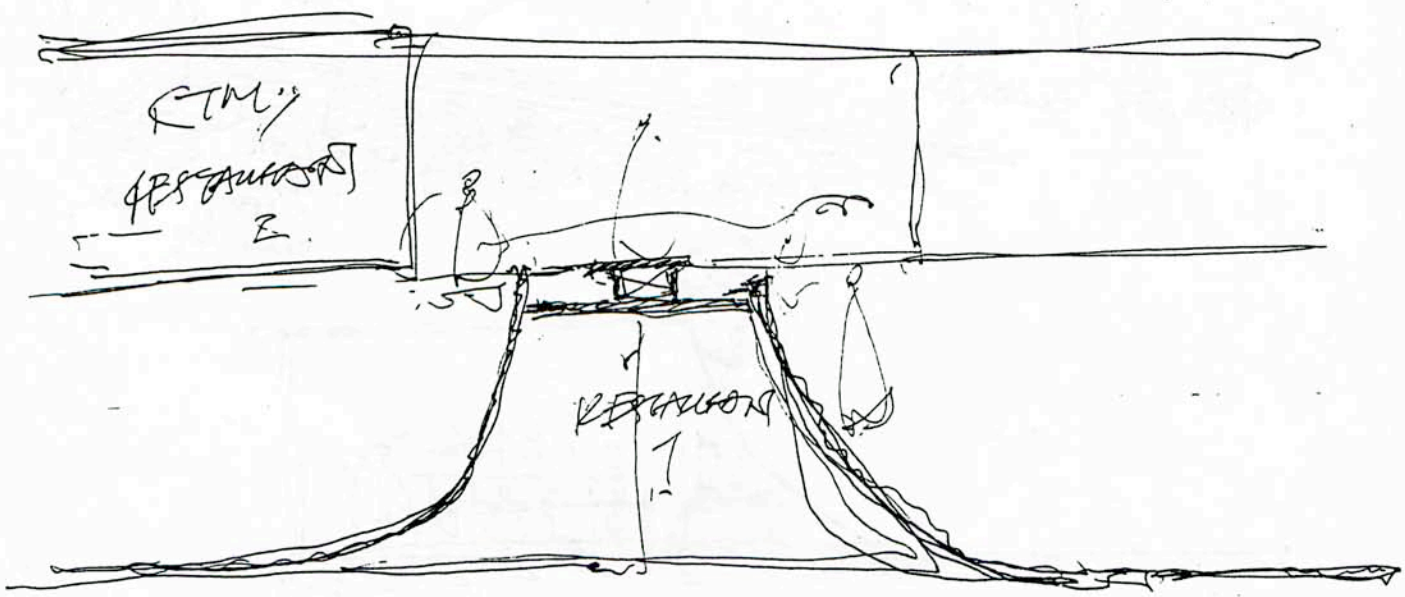
OPENING ON THE CURVED WAVE SIMULATOR FOR VIEW FROM KTV RM.

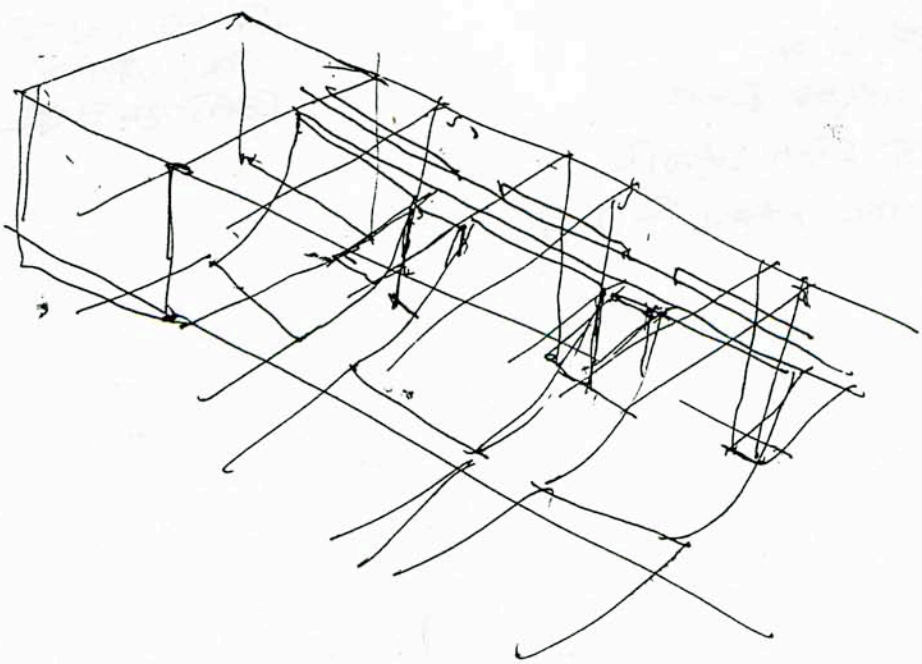
SURFING

DRY + WET FLOOR.



SOUND + SURFING.





5. Site Selection

The selection of the testing site will be based on the criteria below

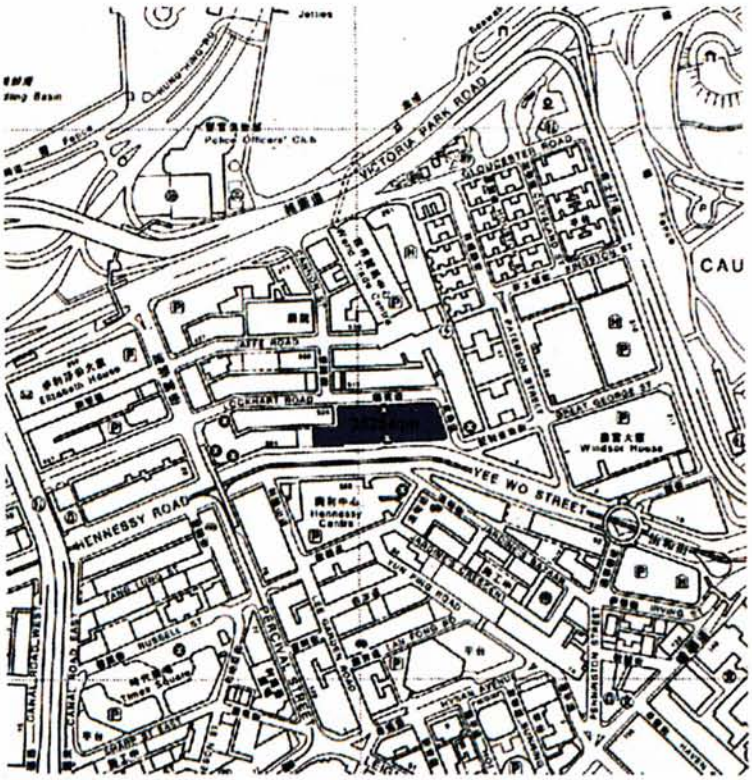
1. Easy access, near pubic transport like MTR to act as people generator
2. Have entertainment nearby close to the program proposed
3. Site area should be large enough to house the minimum requirement of the water sports

Two possible sites

1. The Sogo, Causeway Bay
2. Old building block at Sai Yeung Choi Street South and Nelson Street, Mong Kok

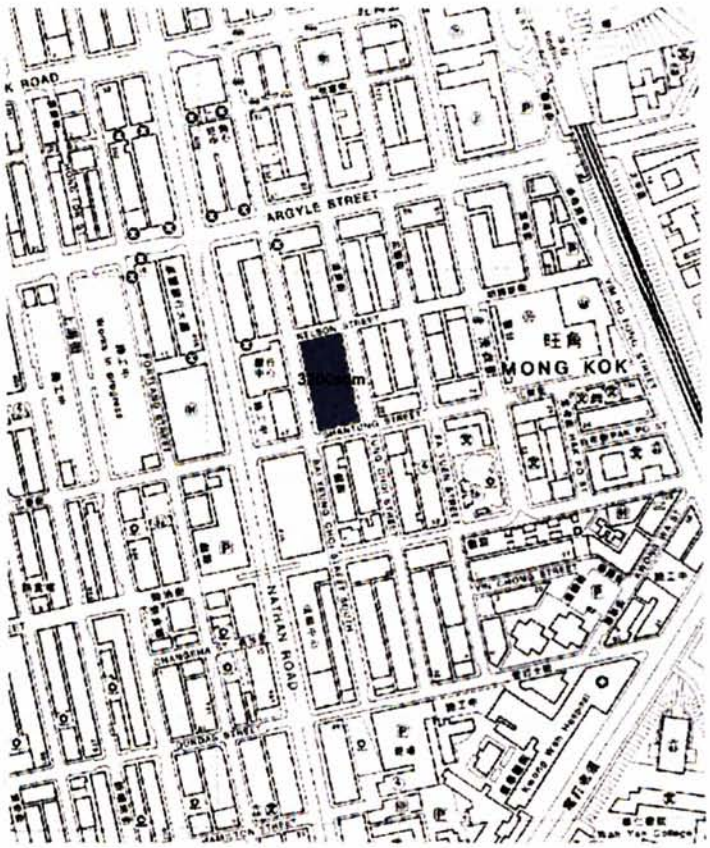
The Sogo, Causeway Bay

The Sogo situates at the middle of Causeway Bay which is know as a entertainment center in Hong Kong Island. The Sogo is sit on the top of the MTR Causeway Bay station with direct basement exit linked to the shopping arcade. The main entrance of it is known as the most popular waiting area. Part of the Lockhart Road will become pedestrian way at the time after working hr and also for Saturday and Sunday afternoon. For the surroundings, along Hennessy Road is commercial area which generates lots of people after five. There are lots of shopping malls around such as Fashion Island, Causeway Bay Plaza. Restaurants and cinema can be easily found around it. Site area is 3525 sqm. This side is relatively close to the shore that sea water may be used in this site for water sport and also there is a yacht club nearby.



Old building block at Sai Yeung Choi Street South and Nelson Street, Mong Kok

Mong Kok is place of entertainment in Kowloon side. The site is close to the exit E of MTR Mong Kok station which is the busiest exit. Part of the Sai Yeung Choi Street South will become pedestrian way at the time after working hr and also for Saturday and Sunday afternoon. And Tung Choi street (Lady Street) is also a pedestrian walkway. For the surroundings, along Nathan Road are commercial building over 20 storeys and beside some shopping mall, the rest of the district is residential. There lots of shopping malls around such as Hollywood Plaza, Sino Shopping Centre. And there is shopping centre which selling one one type of goods e.g. MongKok computer centre. Site are is 3200 sqm.

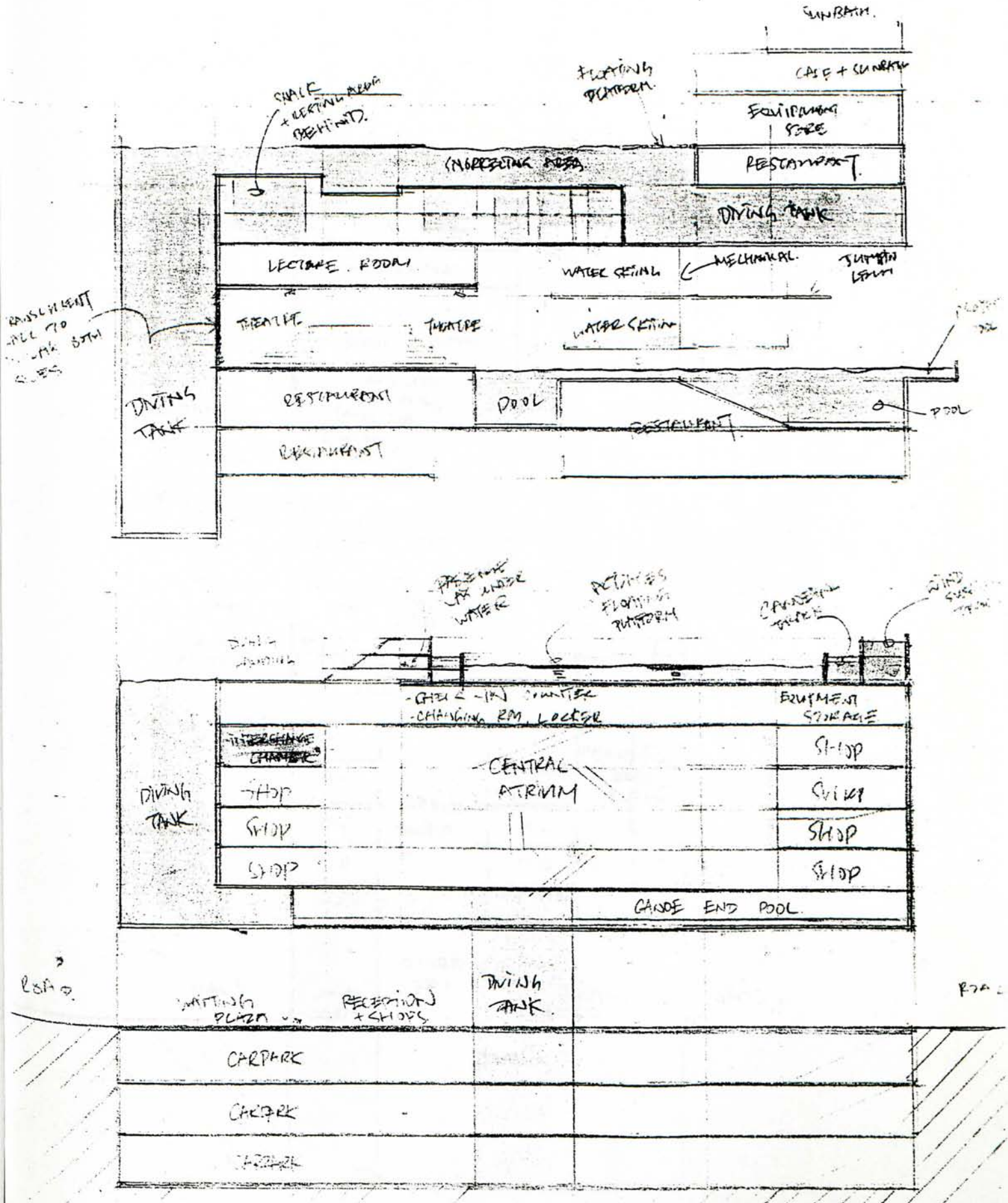


6. 1st proposal of combination

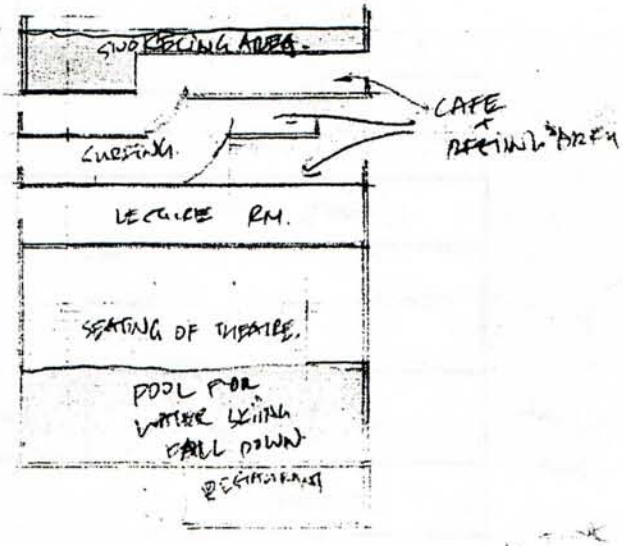
After the feasible idea sketches exercise, a lot of fragment of the combinations are produced. Together the the selection of the site, it is time to put these fragments together to form a building. At the time of mixing the fragments, it is very hard to make the decision of which activities at which area. As there is no logic at that time for the combination, the activities are mixed as my personal interest. And so the product of this stage is failed, it is like throwing different fragments inside a box.

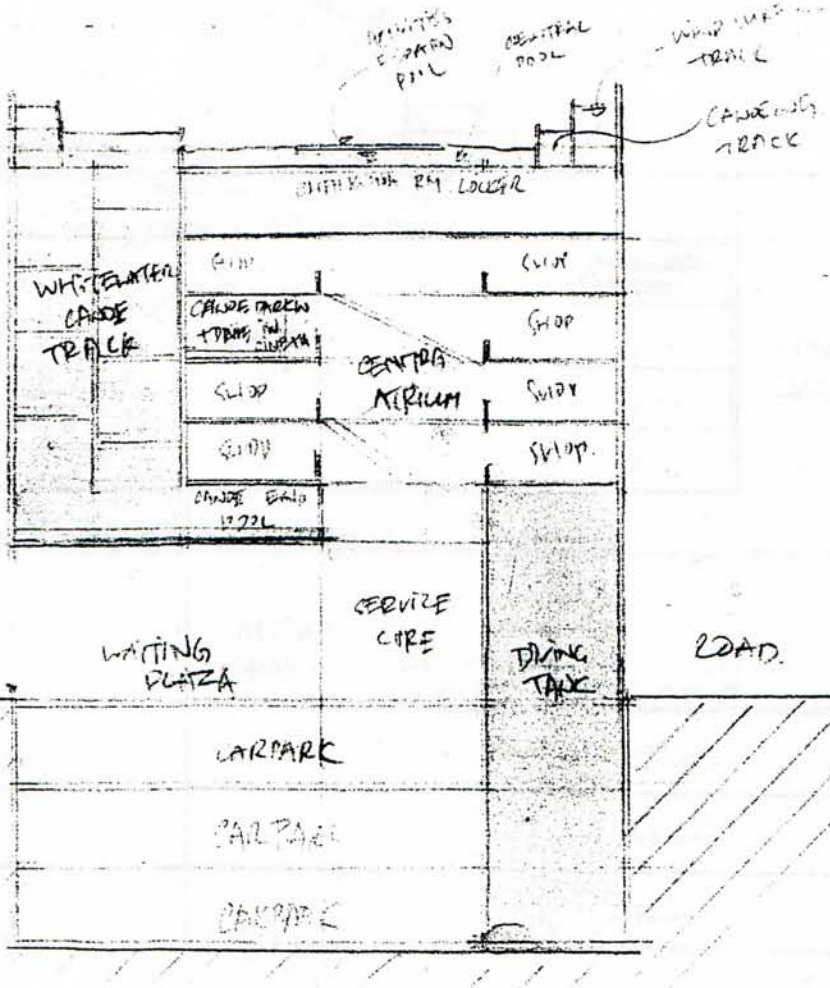
Although it is failed, it also helps me to think of the logic of the combination before another proposal. And also it helps to have a first touch about the the space of each activity, the size and head room are also proposed.

SPATIAL ORGANISATION — LONG SECTION.

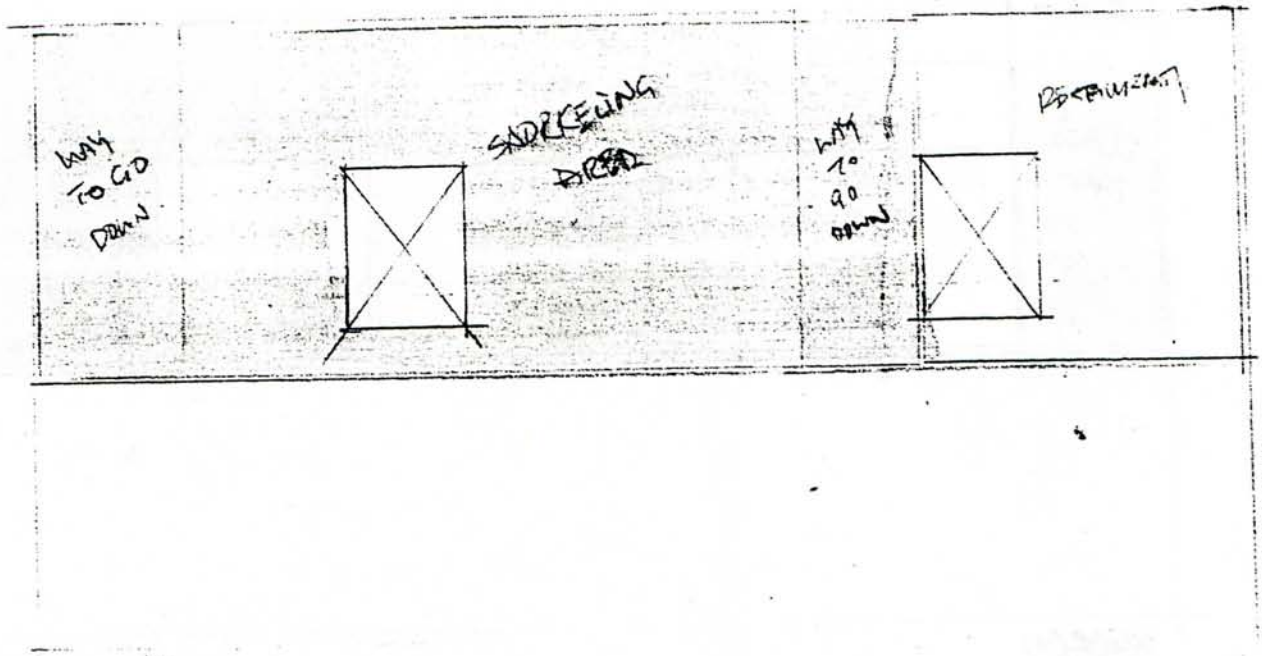


SPATIAL ORGANISATION — SECTION





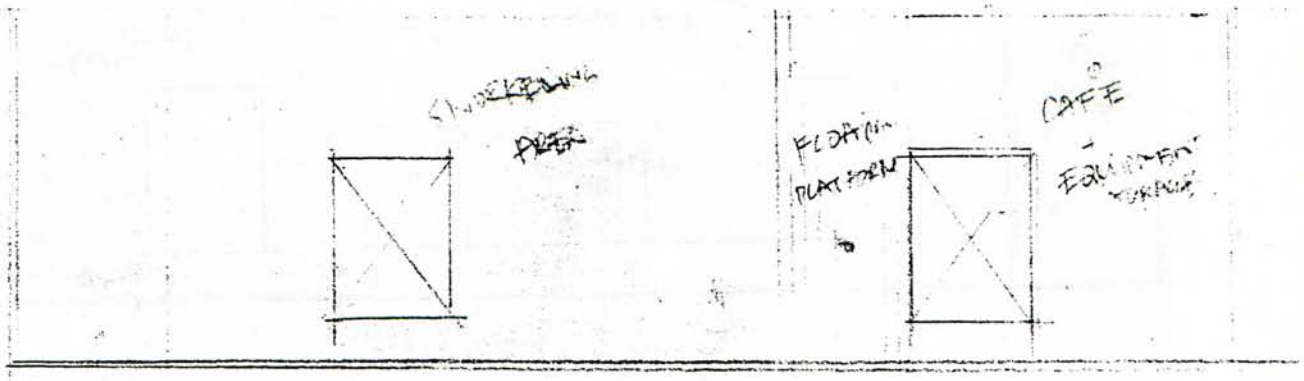
SPATIAL ORGANISATION — PLAN.



SNORKELING LEVEL.

PROGRAM.

- DIVING TANK
- SNORKELING AREA.
- RESTAURANT.

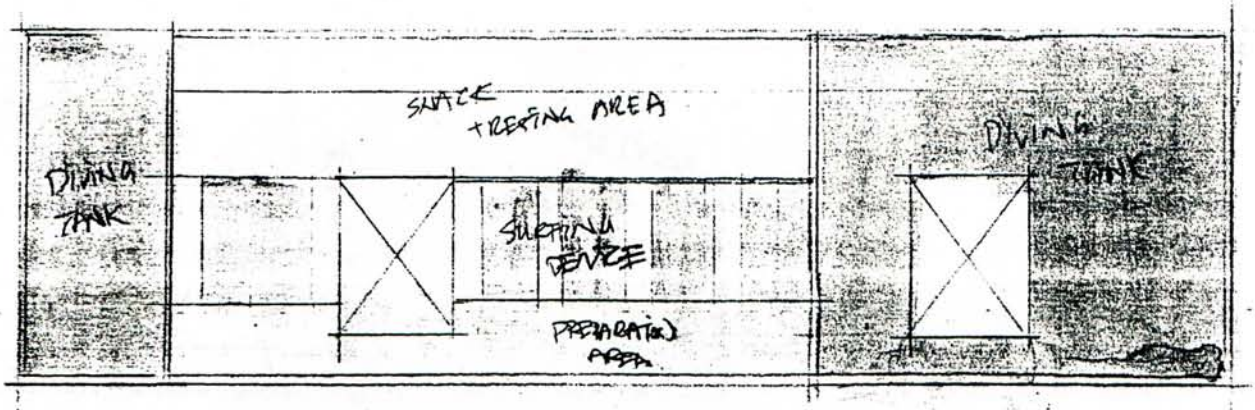


SUNBATH AREA

PROGRAM

- CAFE
- EQUIPMENT STORAGE
- SUNBATH AREA.

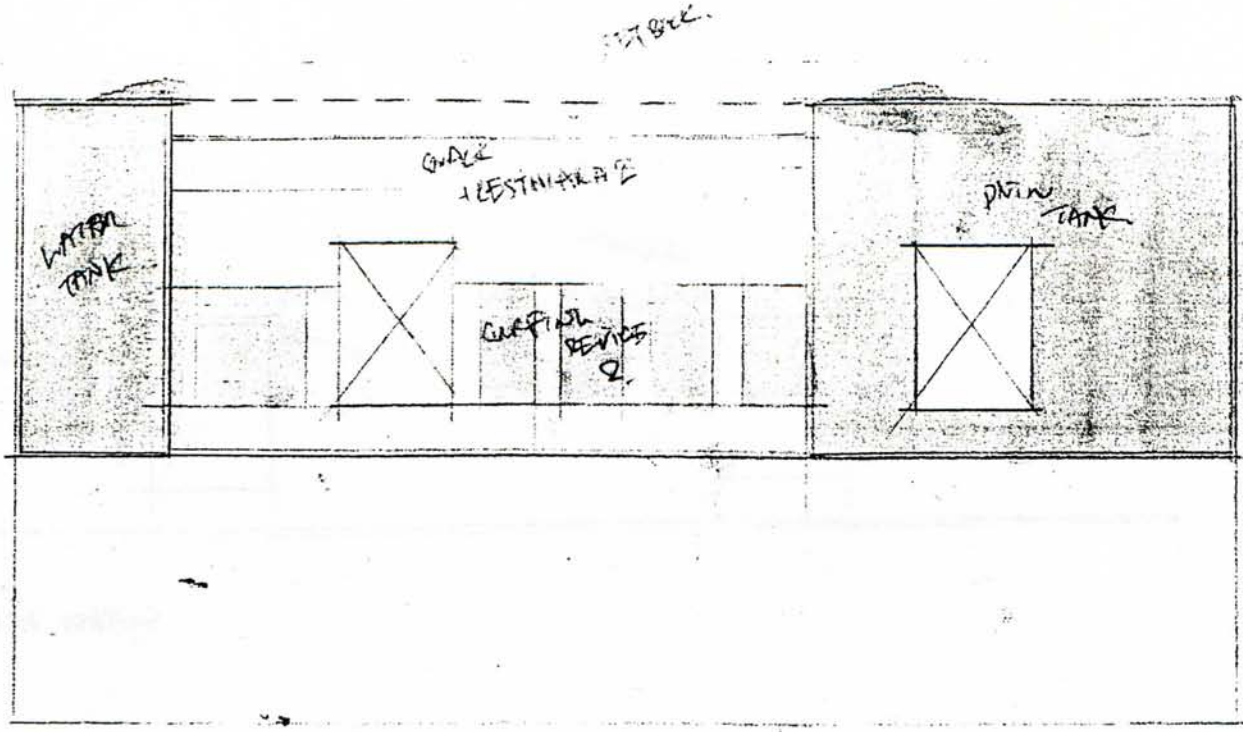
SPATIAL ORGANISATION – PLANS.



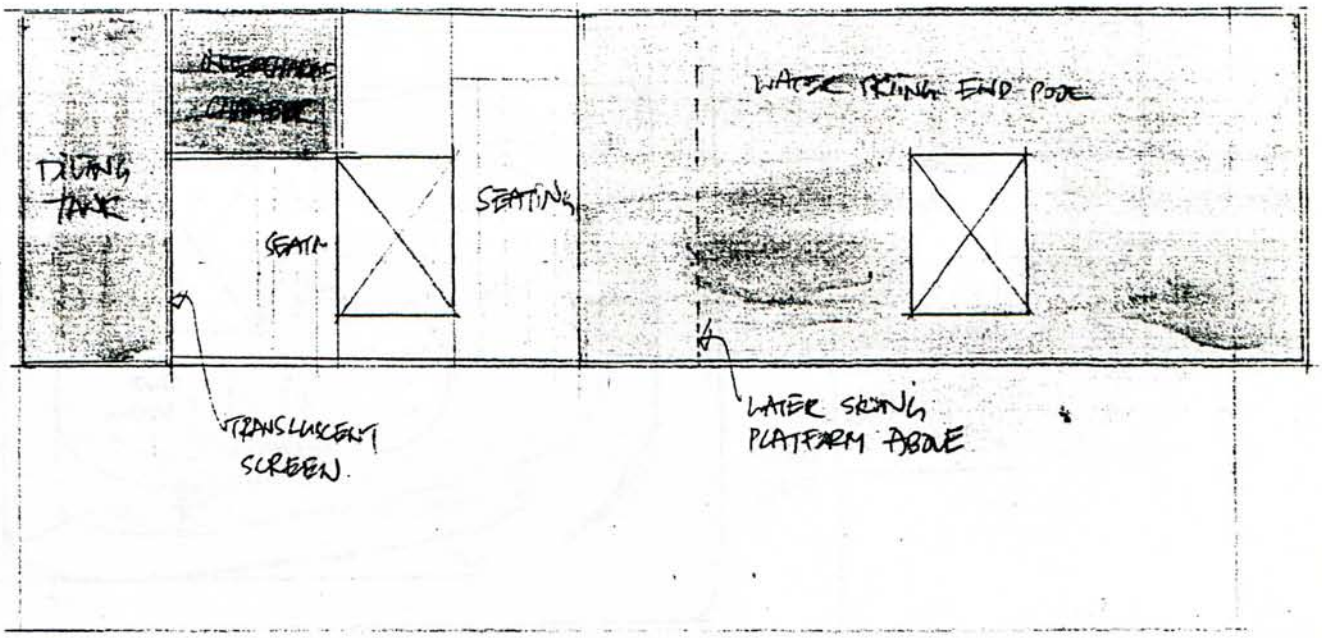
PROGRAM

- SURFING DEVICE + STORAGE
- PREPARATION AREA.
- DIVING TANK X2.
- SNACK + RESTING AREA.

SWIMMING LEVEL.



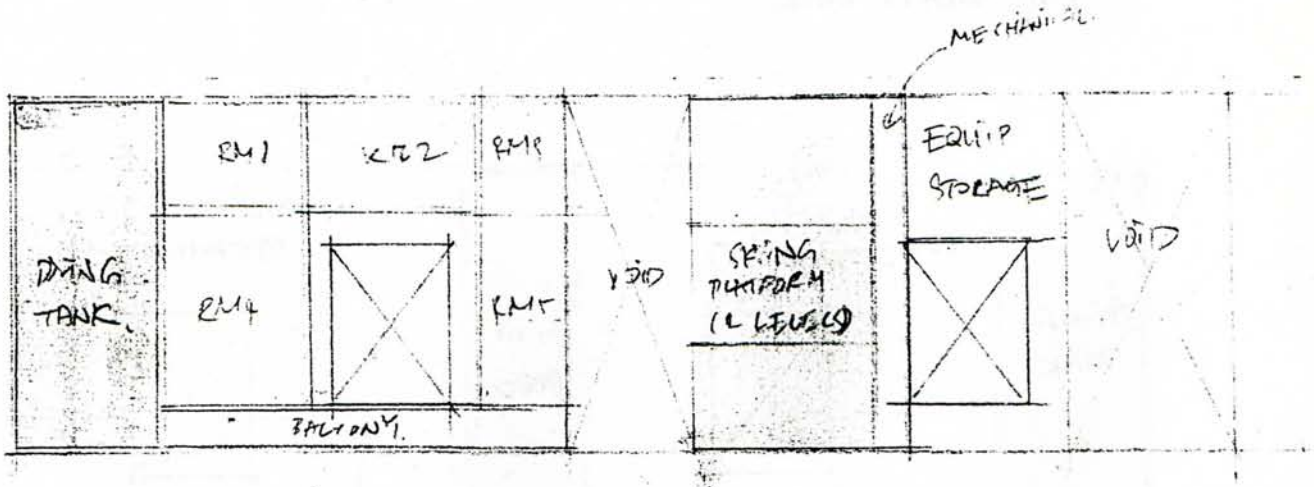
SPATIAL ORGANISATION — PLAN.



PROGRAM

- DIVING TANK W/ TRANSLUCENT SCREEN WALL
- SEATING FOR MONITE
- INTERCHANGE CHAMBER
- WATER SKIING END POOL.

CINEMA LEVEL.

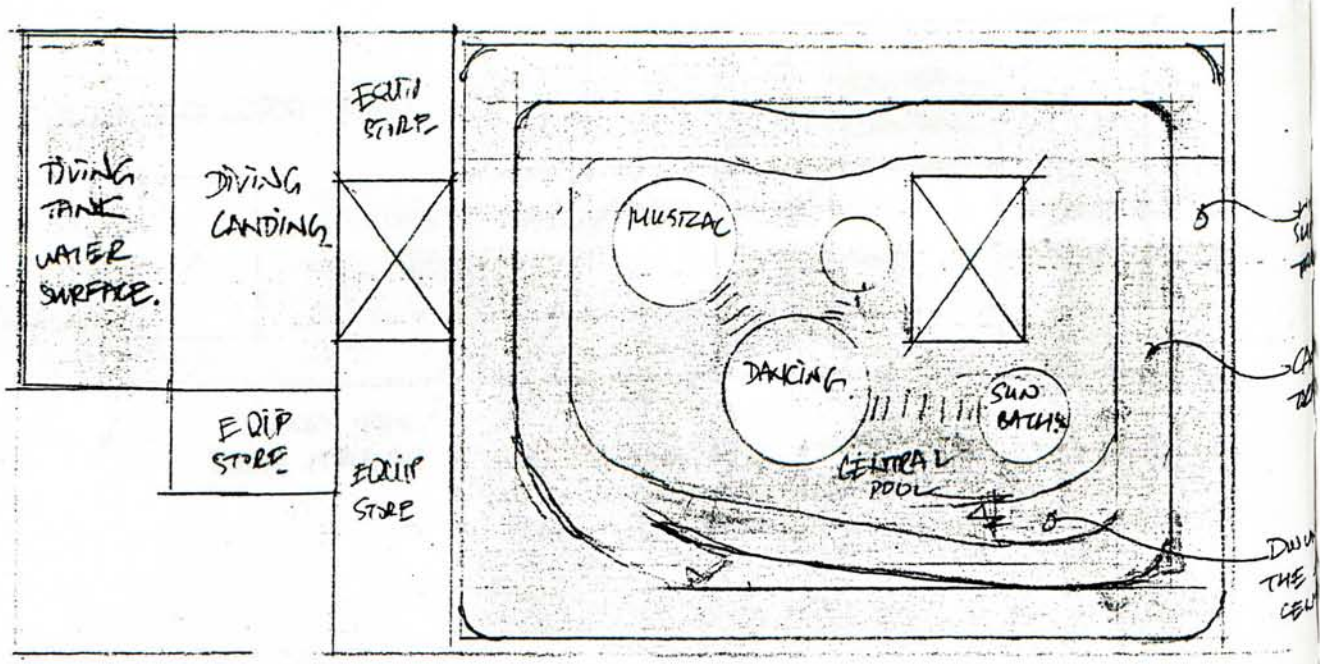


PROGRAM

- DIVING TANK
- CEILING RM.
- SKIING COURT.
- EQUIPMENT STORAGE.

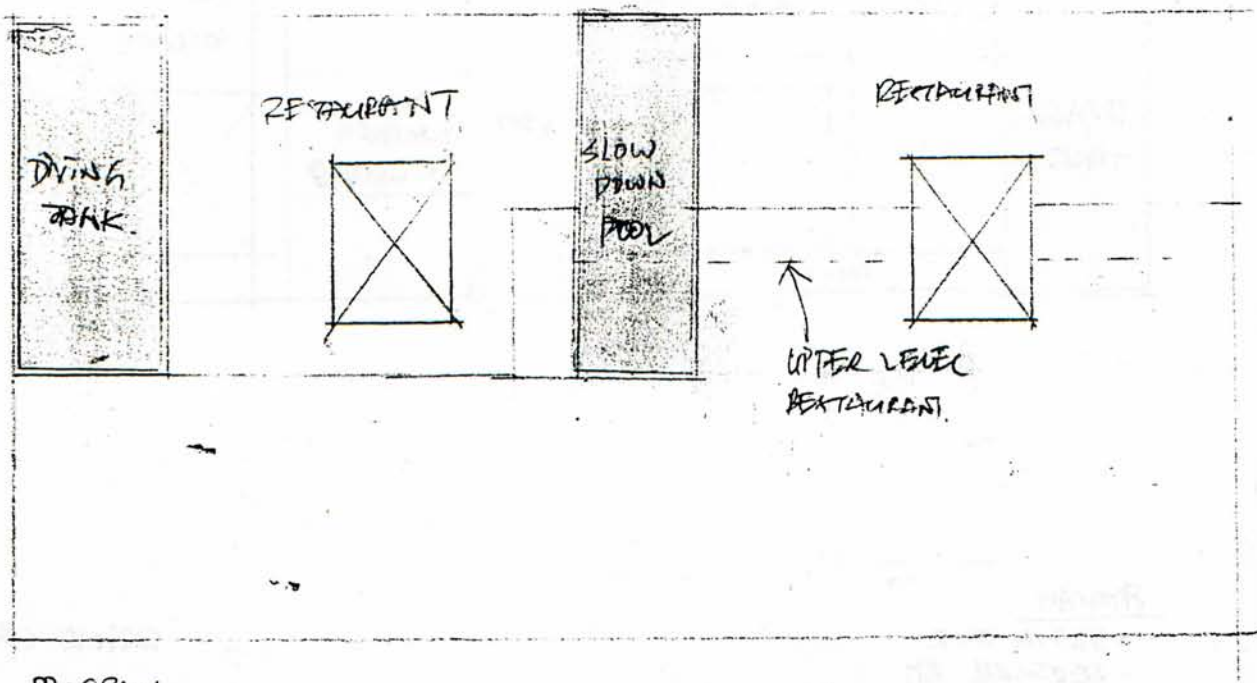
SKIING LEVEL

SPATIAL ORGANISATION – PLAN.



- DIVING LANDING.
- EQUIPMENT STORAGE
- CENTRAL POOL W/ ACTIVITIES PLATFORM.
- CANOE TRACK
- WIND SURFING TRACK.
- WAY DOWN TO ANDERS SLOPED TRACK
- WAY DOWN TO CHANGING RM.

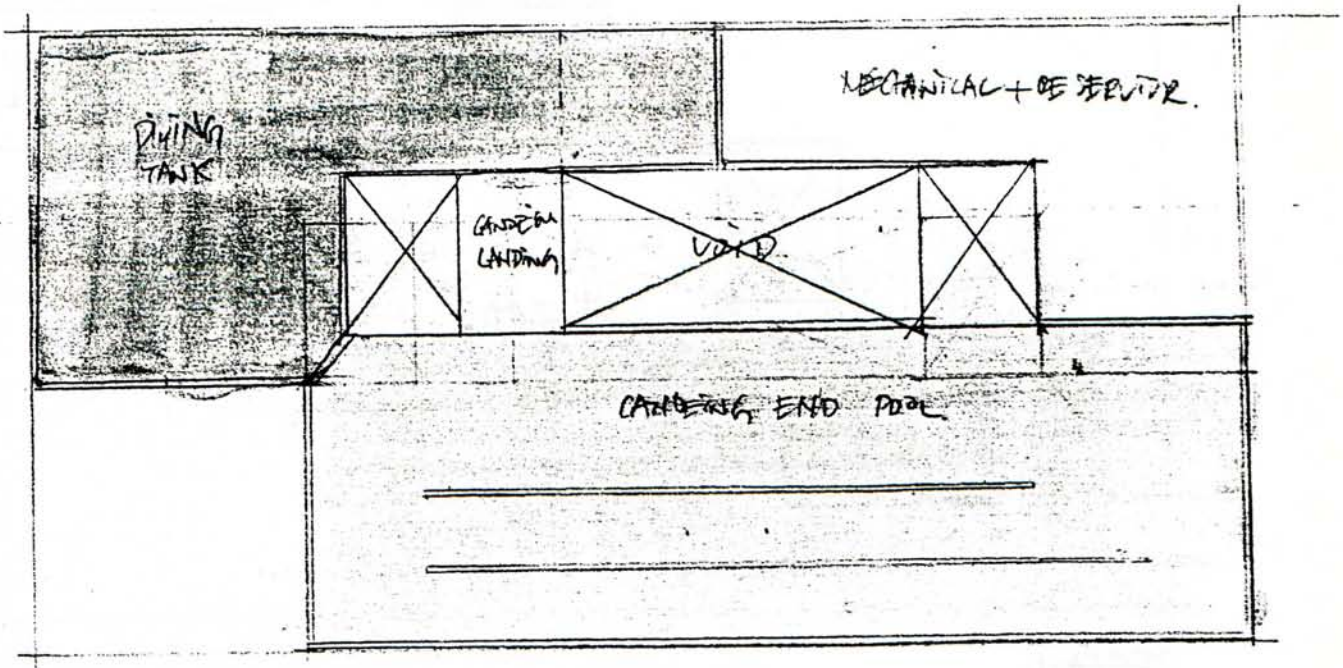
- CENTRAL POOL.



PROGRAM.

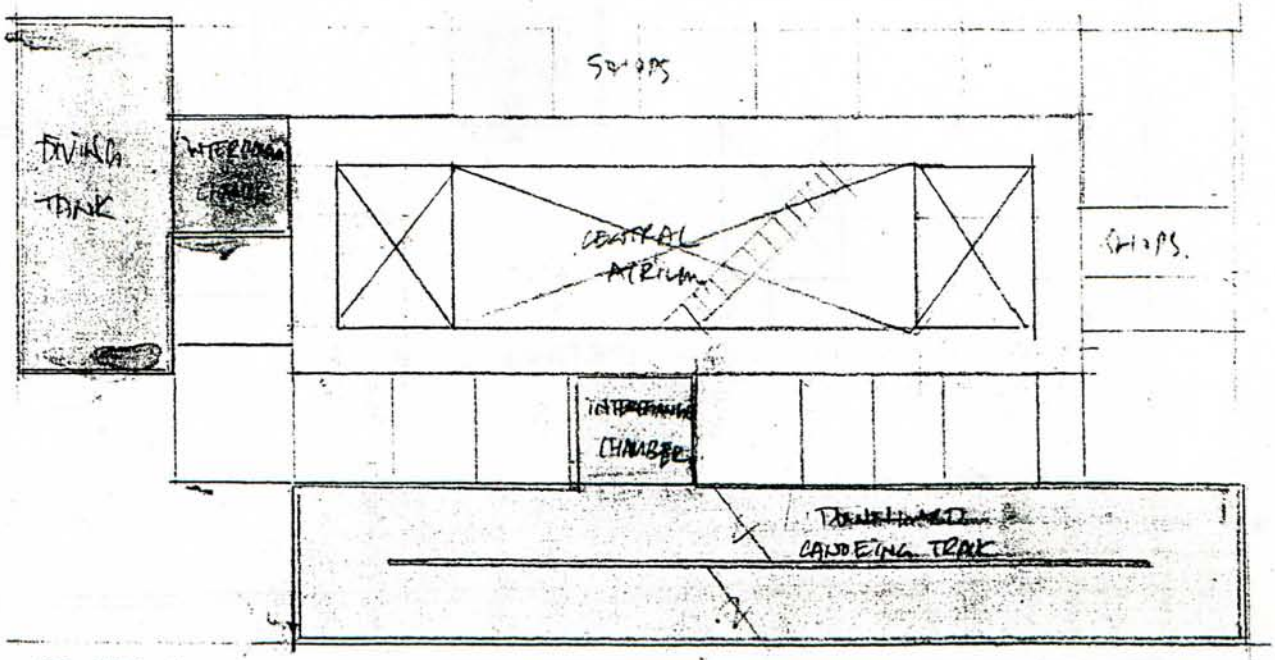
- RESTAURANTS
- DIVING TANK.
  W/ INTERCHANGING CHAMBER.

SPATIAL ORGANISATION – PLAN.



I/F PLAN.

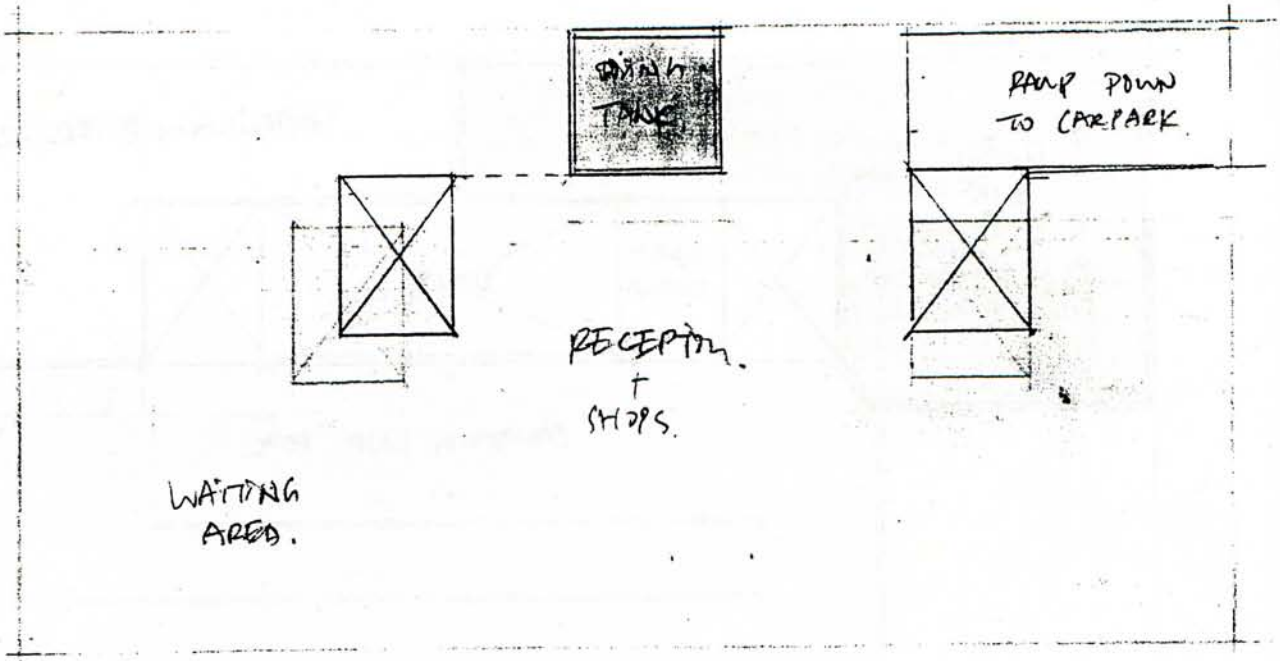
PROGRAM.
- DIVING TANK HORIZONTAL.
- CANOEING END POOL
- CANOEING LANDING.
- MECHANICAL.
- RESERVOIR.



Σ= I/F PLAN.

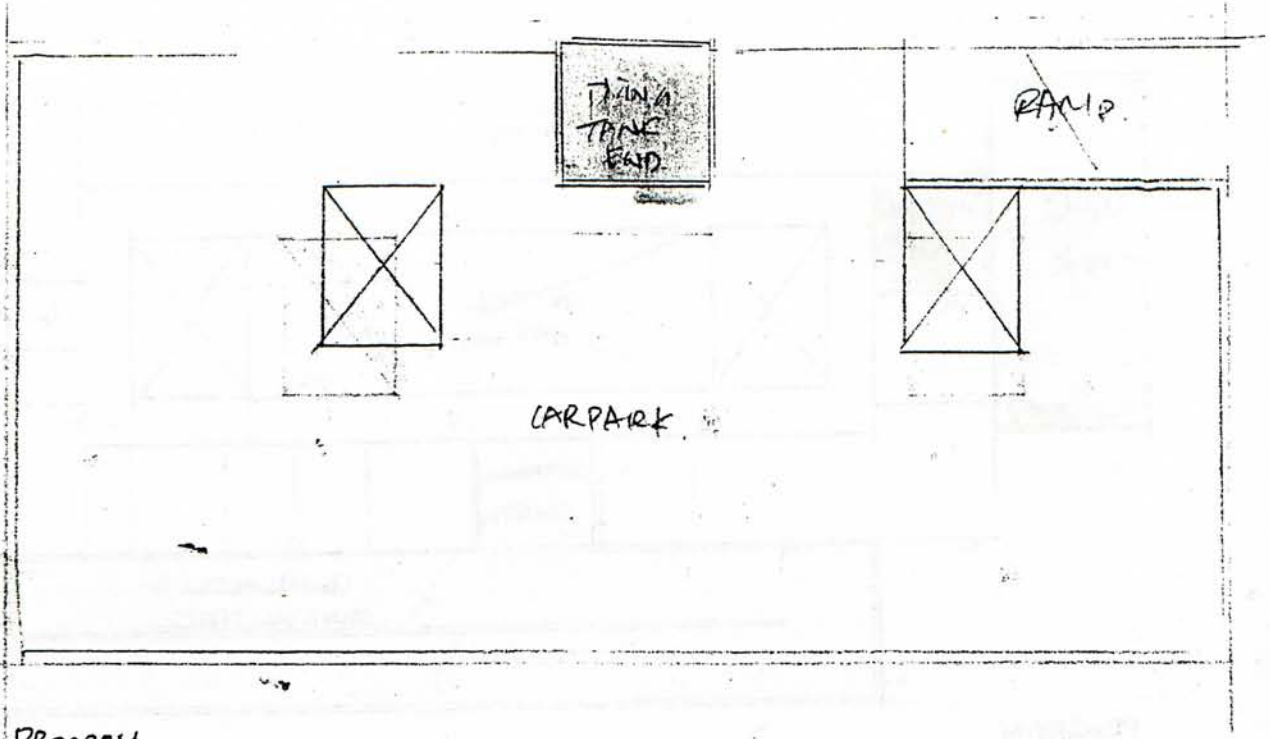
PROGRAM
- DIVING TANK W/ INTERCHANGE CAMBER.
- CANOEING TRACK. W/ INTERCHANGE CAMBER.
- MOVIE PROJECTION.
- CANOE – "DRIVE-IN" CINEMA.
- SHOPS
- WINDOW SHOP FOR CANOEING OR DRIVING.

SPATIAL ORGANISATION - PLAN.



PROGRAM:
- WAITING PLAZA
- RECEPTION
- SHOPS
- RAMP DOWN
- WATER TANK DOWN.

G/F PLAN.



PROGRAM.
- CARPARK.
- WATER TANK.

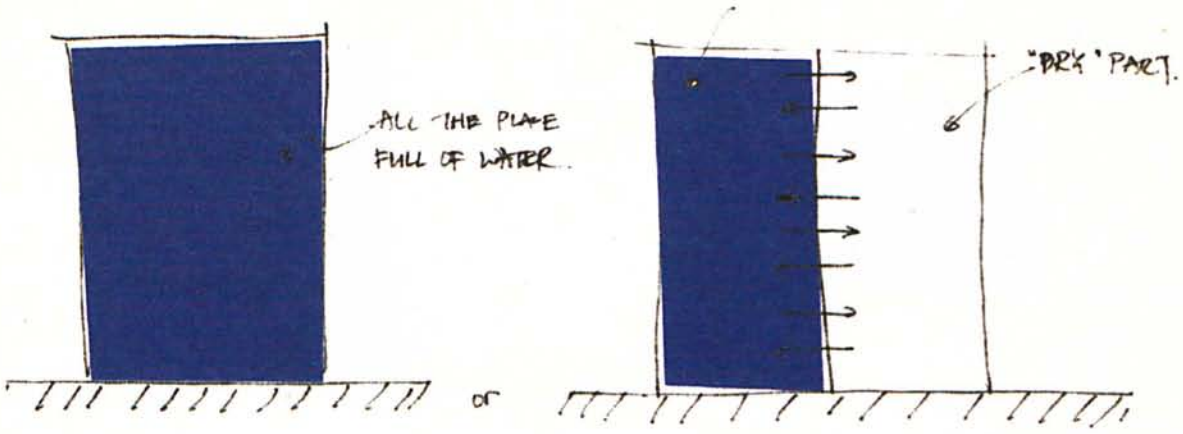
BASEMENT.

7. Logic of Combination

After the failure ot the first proposal of combination, there should be a logic that guide the combination of the fragments. In this part of work, serveral logic are proposed, and the advantages and disadvantages of each logic is also be studied. Finally, a few examples that can apply that logic are also be produced.

Logic 1

Users:Swimmers as only users



Advantages

Totally new for public

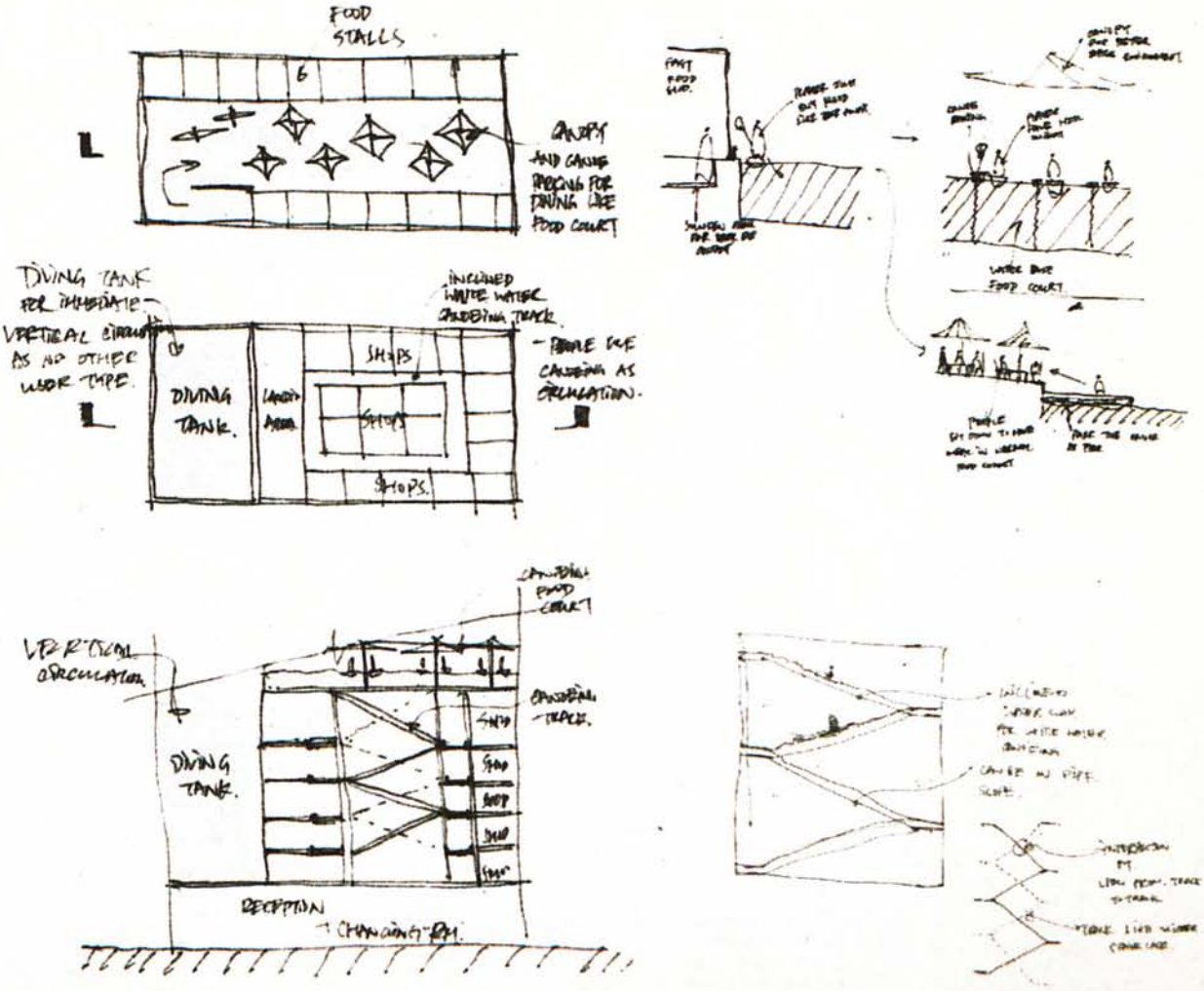
As all the usersare wet, the problem of dry and wet users conflict can be eliminated

Disadvantages

Economically not good since users limited

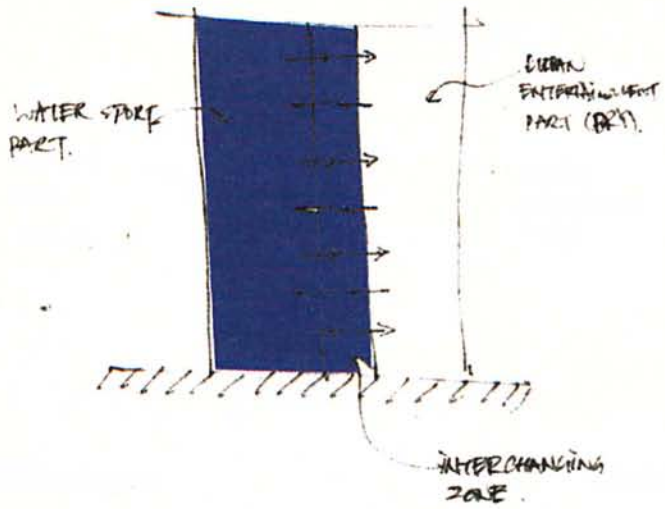
Not all the time of the day is occupied

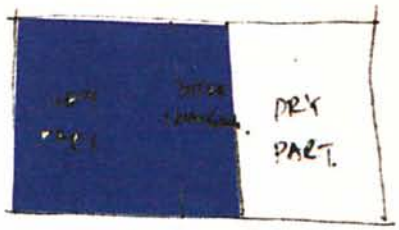
Change in number of users seasonally



Logic 2

Users: 2 Types, Swimmers and non-swimmers but Mixed





Advantages

New environment for public

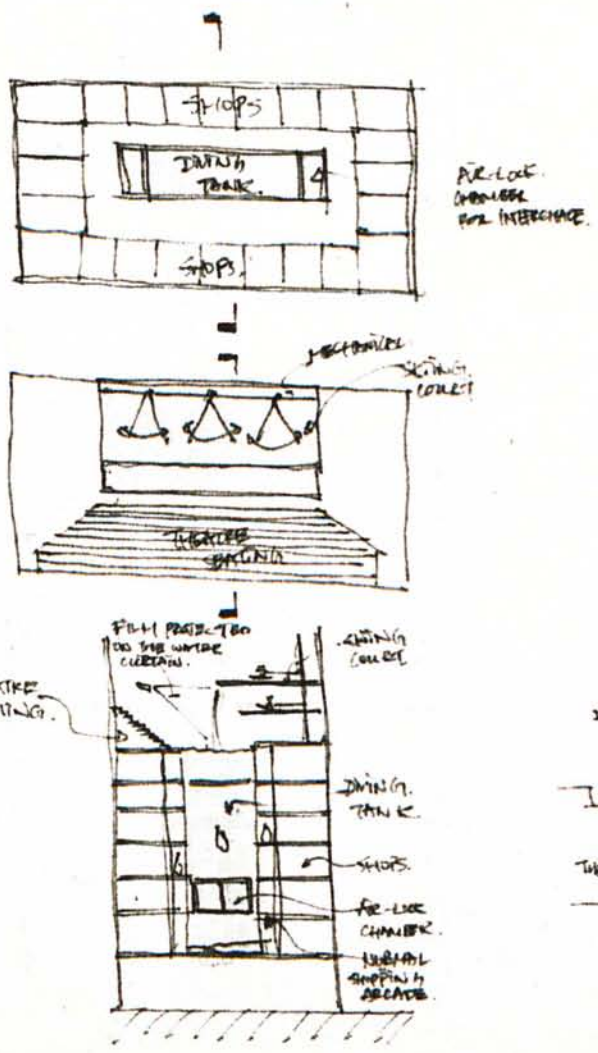
Increase popularity by letting more people t get in

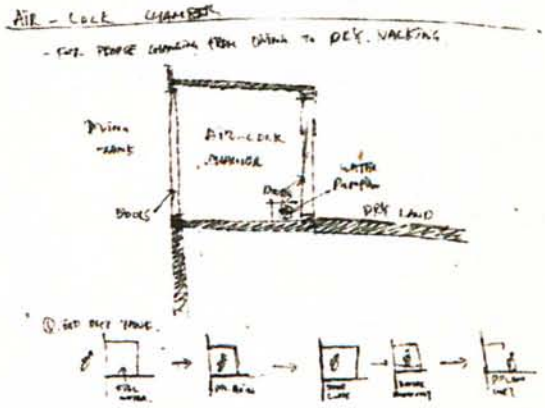
It allows the real mixing happen

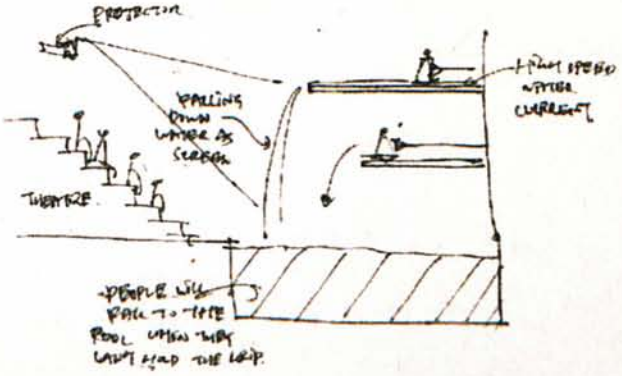
Disadvantages

Problems of mixing the wet and dry activites

Cultural problem

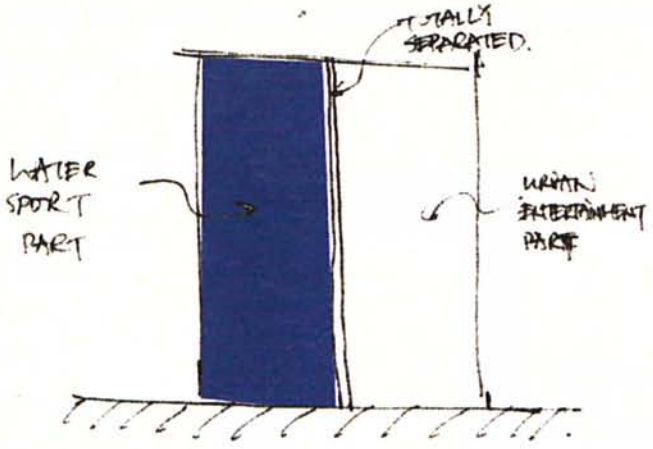


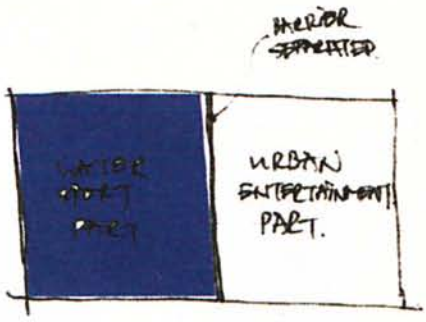




Logic 3

Users: 2 Types, Swimmers and non-swimmers but NOT Mixed





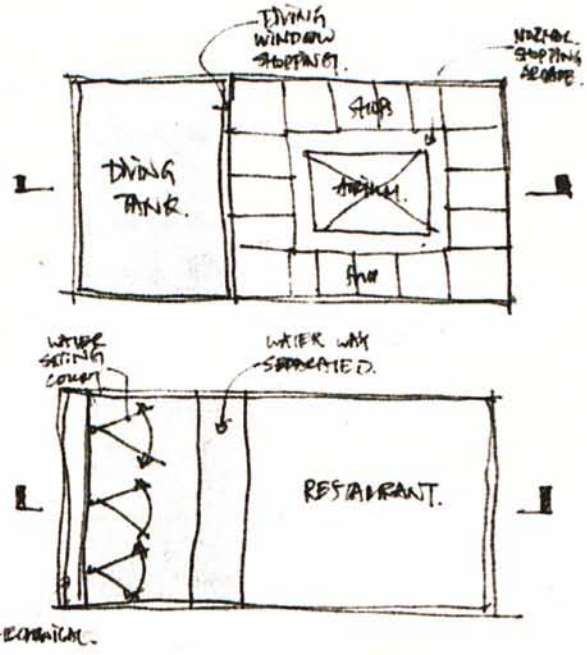
Advantages

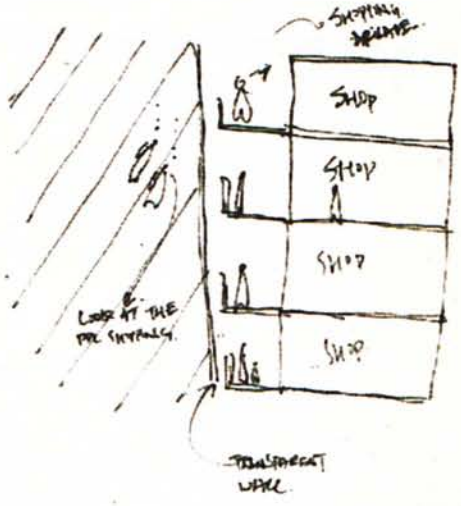
Dry and wet totally separarted, separated structure and system can be used

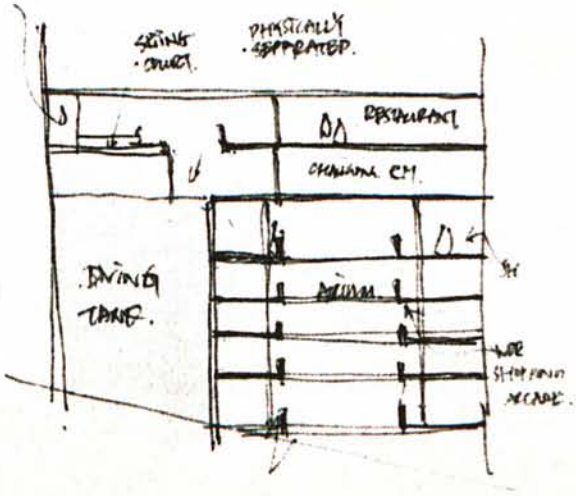
Disadvantages

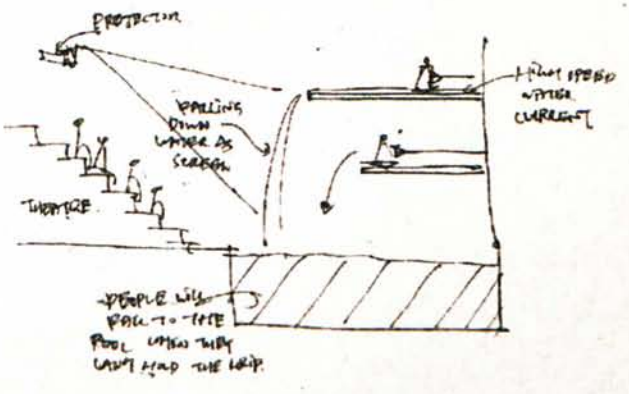
Provide view only, not really mixing

Seem to be two separated bldg





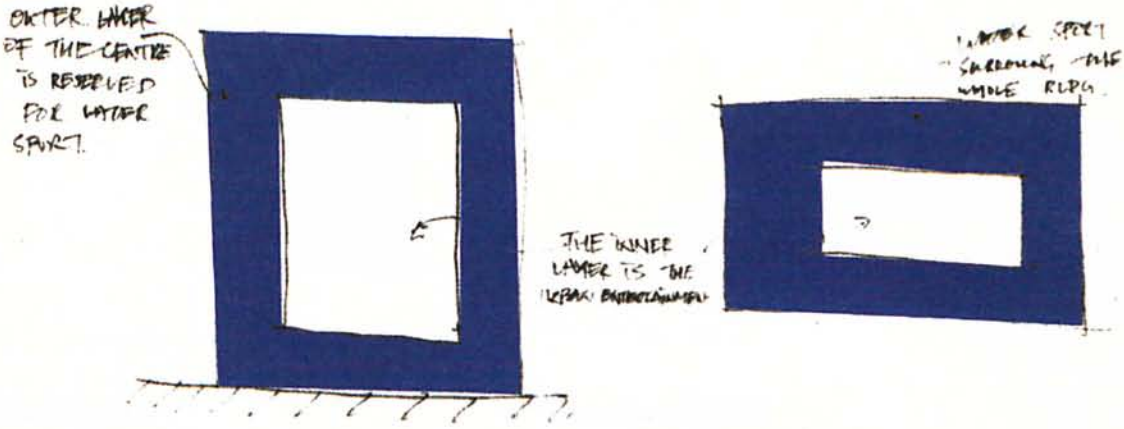




Logic 4

Outward Expressive

Putting the water sports parts close to the envelpo of the building. Making it expressive towards the surroundings.



Advantages

Attactive

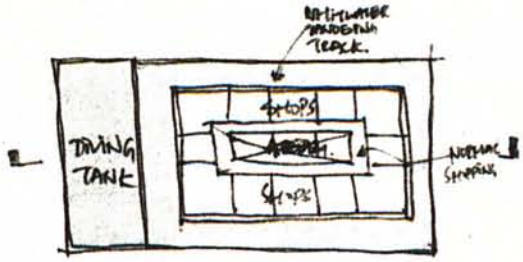
The way of hybridity can be easily seen from outside

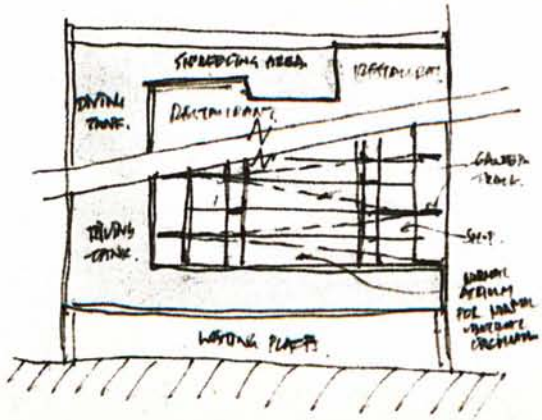
Lots of the urban entertainment do not

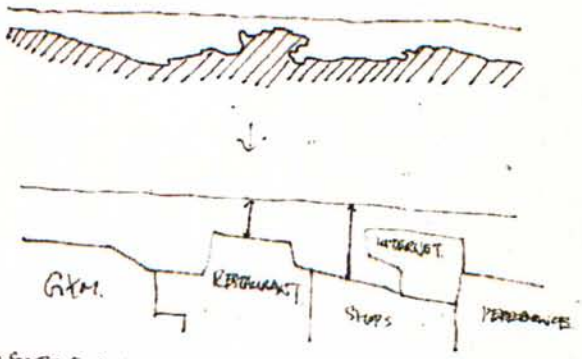
Disadvantages

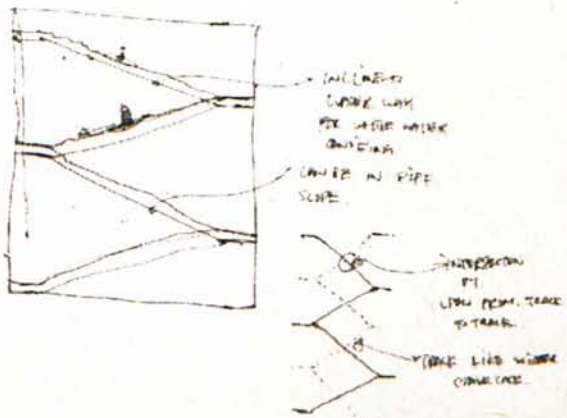
All the interesting parts of the building is seen from outside

Special structure and system for water sports is not centralized.





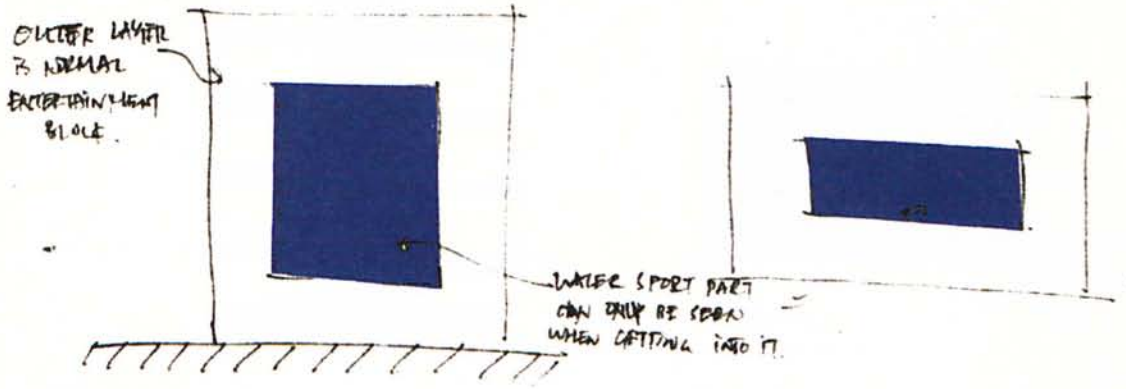




Logic 5

Intward Expressive

Water sport zone is enclosed by the entertainment block. The outlook of the it is like a normal shopping complex which can be easily seen in Mongkok.



Advantages

Keep interesting block secret

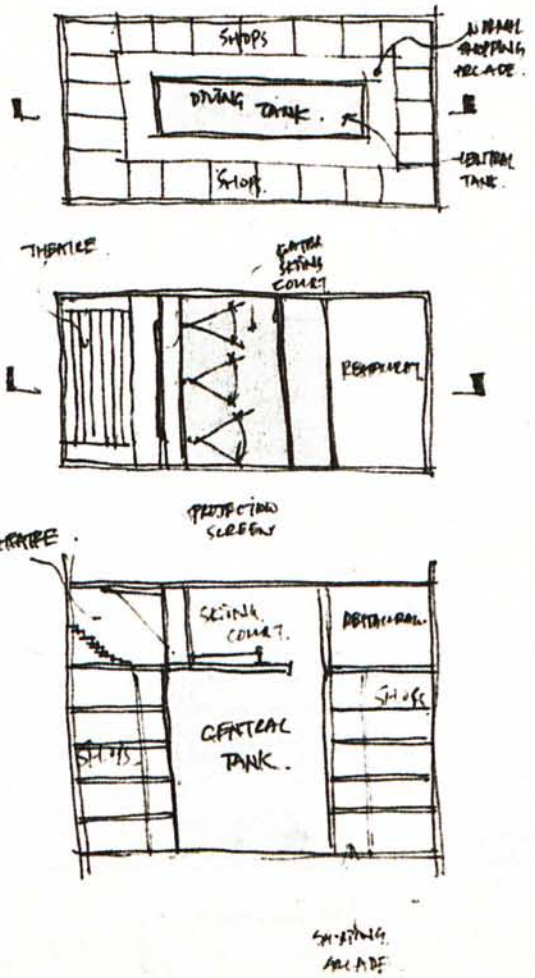
Special structure and system for water sport is centralized

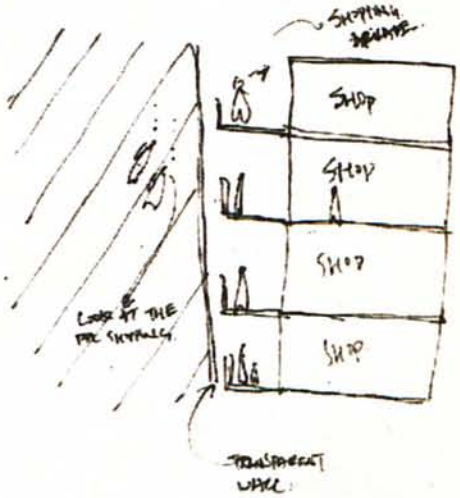
Disadvantages

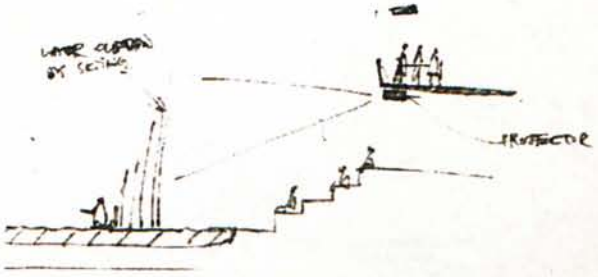
Not attractive as it looks like an ordinary shopping complex

Some water sports need wind, e.g. wind surfing

Only inward looking, people playing may lose interest very soon



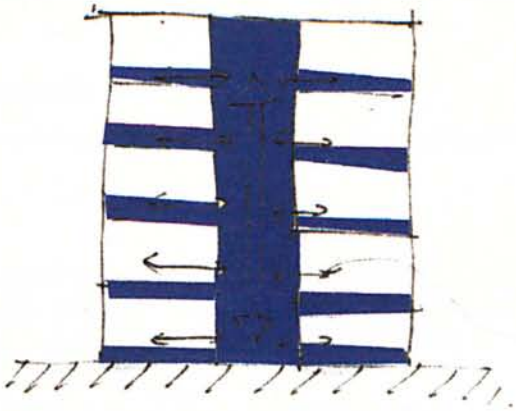


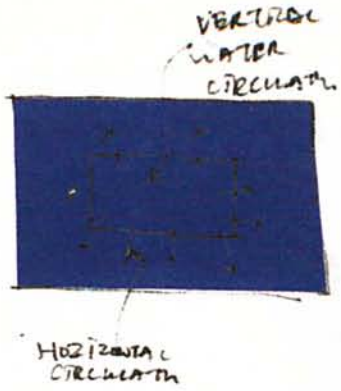


Logic 6

As Circulation

All the vertical and horizontal circulation is by water activities. This applies all the users are swimmers.





Advantages

Real mixing or water sports and the urban entertainment

It fits the natural of water sports, motion in both vertical and horizontal

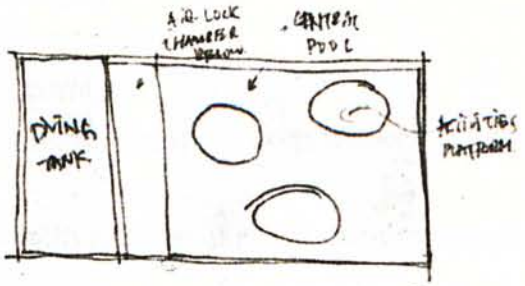
Disadvantages

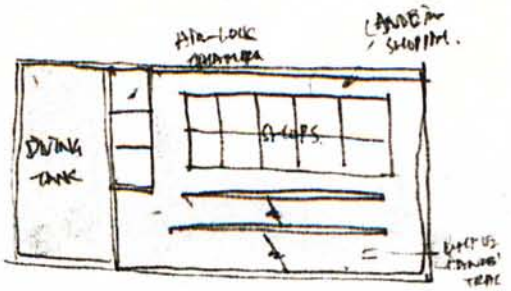
Limited users

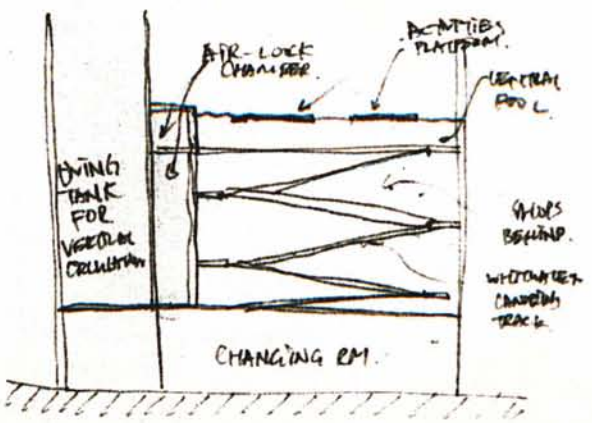
Seaaonal Problem

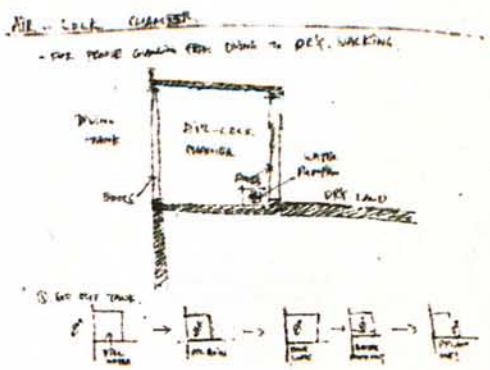
Not all the water sports are moving, e.g. surfing

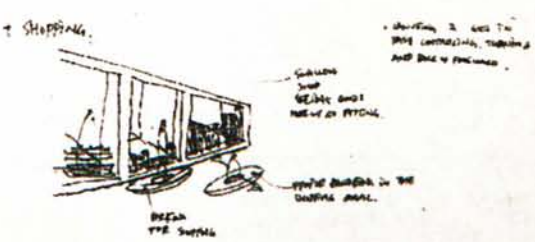
Structure and system decentralized











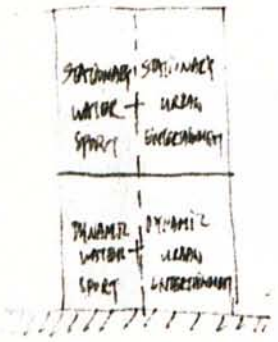
Logic 7

Motion Natural of Activities

Both urban entertainment and water sports can be divided into dynamic and stationary. By different combination of dynamic and stationary, dryand wet, different combination can be found.

1. Horizontally

A. Same come together

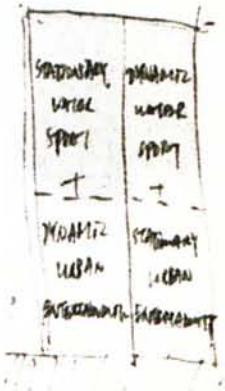


B. Different come together

2. Vertically

A. Same come together

B. Different come together



For A

Advantages

Motion coherent

Disadvantages

It will become boring if both the activities stay still

When both moving, it is not concentrate to do the hybrid

For B

Advantages

Motion balance

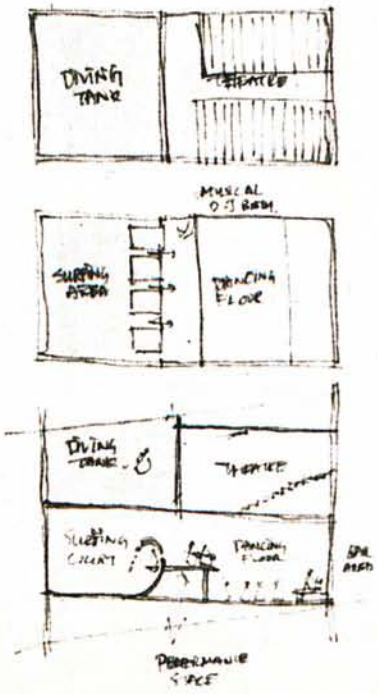
Not boring

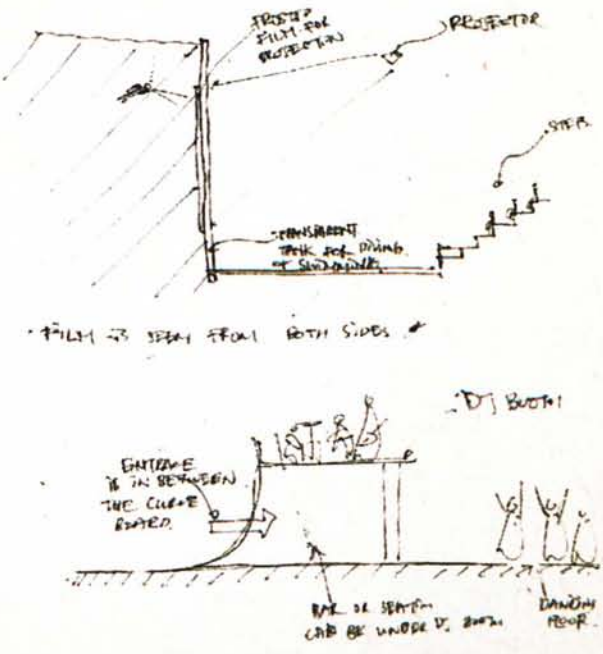
One can stay still to appreciate others

Act as a resting place for the motion

Disadvantages

No clear zone separated, people may lose their way

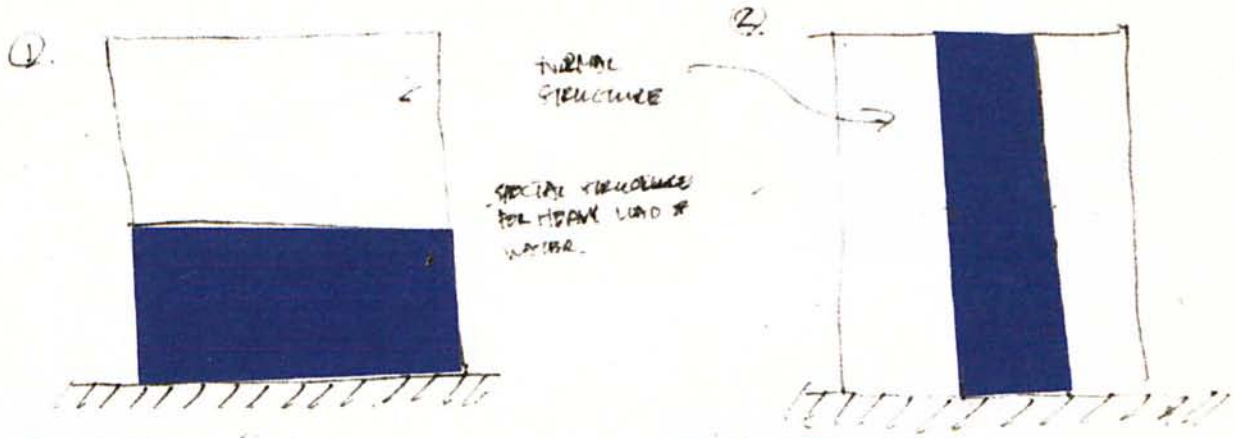




Logic 8

Structural Efficiency

As water sports part of the building requires different structure and special water system, e.g. water pump system, purifying system, from the entertainment part of the building. If these two parts can be separated. it can avoid the redundant structure.



Horizontal Separated

Advantages

Efficient as the heavy structure near the ground

Disadvantages

The hybrid surface is too small

Not much interaction , it likes different activities come under one roof

Load transfering makes the structure transmmision difficult

Vertical Separated

Advantages

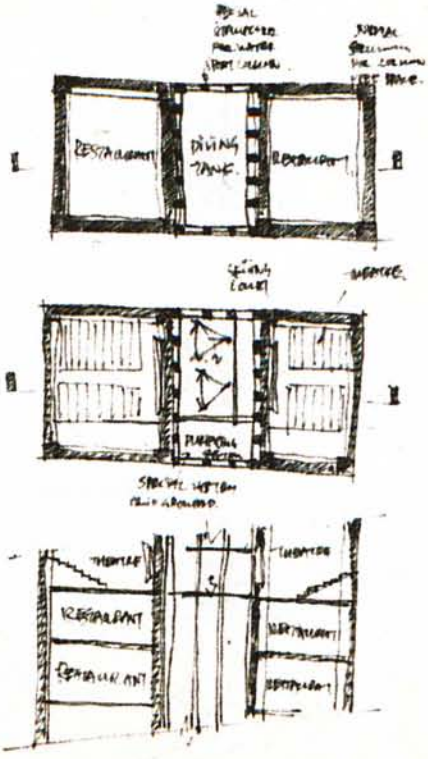
It still has the advantage of structure separation

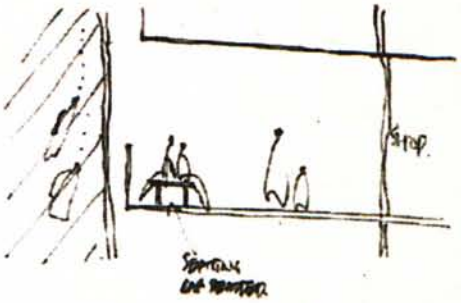
Large surface for activities hybridity

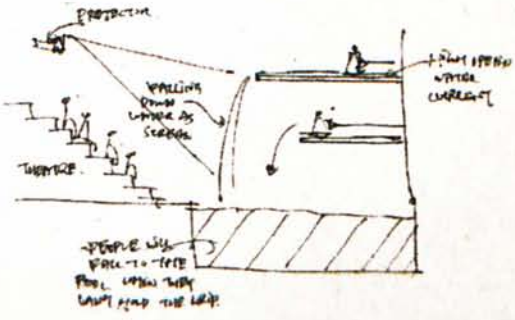
No structural transmmision

Disadvantages

Area for water sport is limited



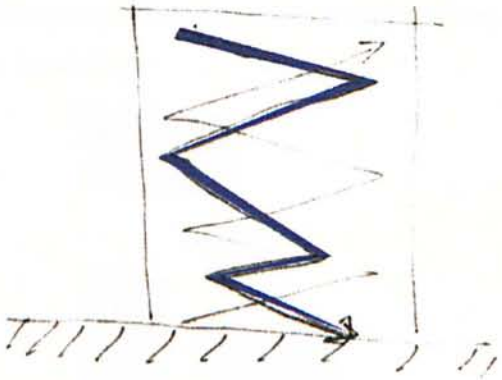


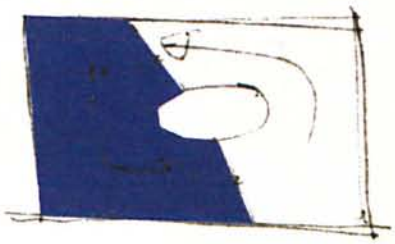


Logic 9

Path

Path of the water is different from the path of the urban entertainment. And at certain point, they will meet and the hybridity will happen.





Advantages

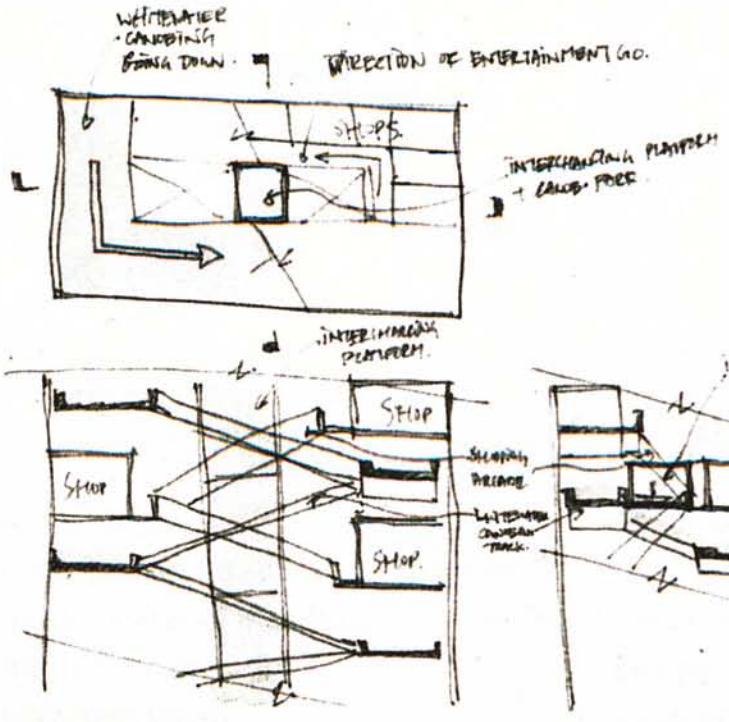
Clear path for users

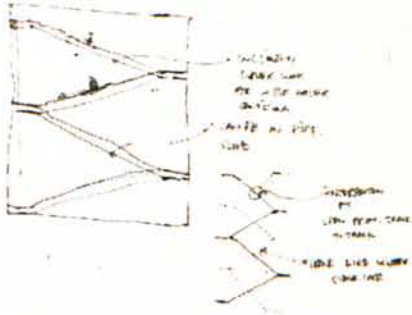
Not the entire building hybrid, just at certain point

Disadvantages

Special structure and system of water sport is not centralized

Not all the activities are directional



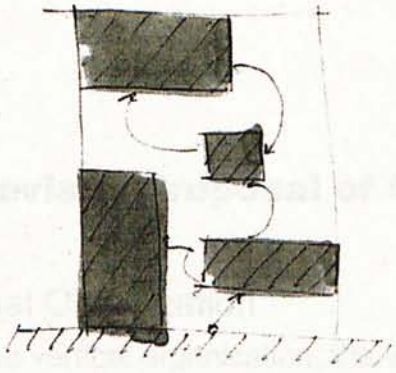


Logic 10

Economic

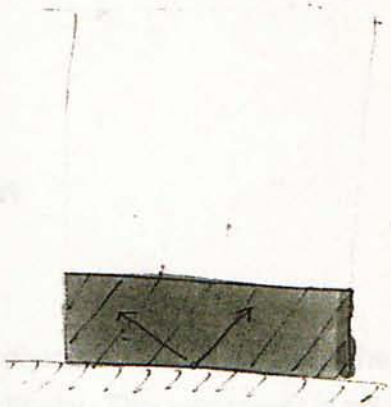
Define the activities that people always consume. And by putting these profit-generator in different part of the building, it will give out different effects.

1. Profit-generator scattered around the whole building



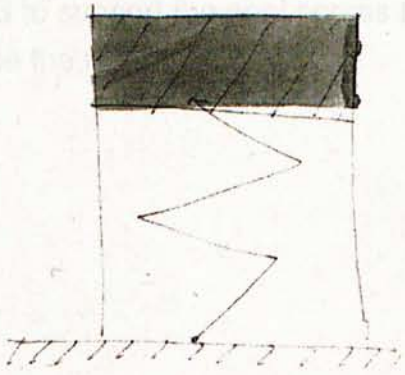
Advantages
People may go to other zones by accident
Disadvantages
No clear route, people may lose their way

2. Profit-generator at ground



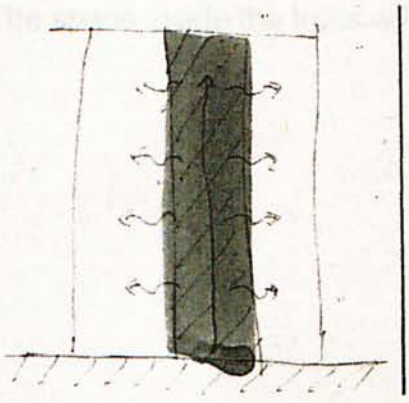
Advantages
The profit-generator make as much as possible and can support the rest of the building
Disadvantages
Upper level will be lack of people

3. Profit-generator at top



Advantages
Long way to go to the profit-generator, more chance for people to consume when they are on the way
Disadvantages
If it is too long, people will lose the interest

4. Profit-generator centralized



Advantages
Easy to find the profit-generator
Large contact surface to provide chance for people to go a little bit further from the profit-generator

8. Revised Proposal of Combination

Spatial Organization

For the vertical organization, the whole building is divided into 3 columns. The water part and the non water part is separated into zones vertically. The wet tower is sit in between 2 dry towers to provide interaction between the dry and wet activities.

In horizontal direction, the building is divided into 3 layers. The separation is the pools for water sports and mechanical floor. For each layer, the water sport is hybridized with a kind of urban entertainment.

For the structure, a steel rigid frame is employed for the dry towers. And planar truss is used to support the pool across the 2 rigid towers. The space inside the truss will become the mechanical floor.

8. Revised Proposal of Combination

TOPIC

Water Entertainment Centre

CONCEPT

The concept is called "Programmatic Hybridity". It is a way of treating the mix use building. In most cases the mix use buildings are just putting the different functions under one roof. And in programmatic hybridity, the offspring will be survived even one of his father or mother is known as unusual activity.

PROGRAM

Two original categories of hybridity

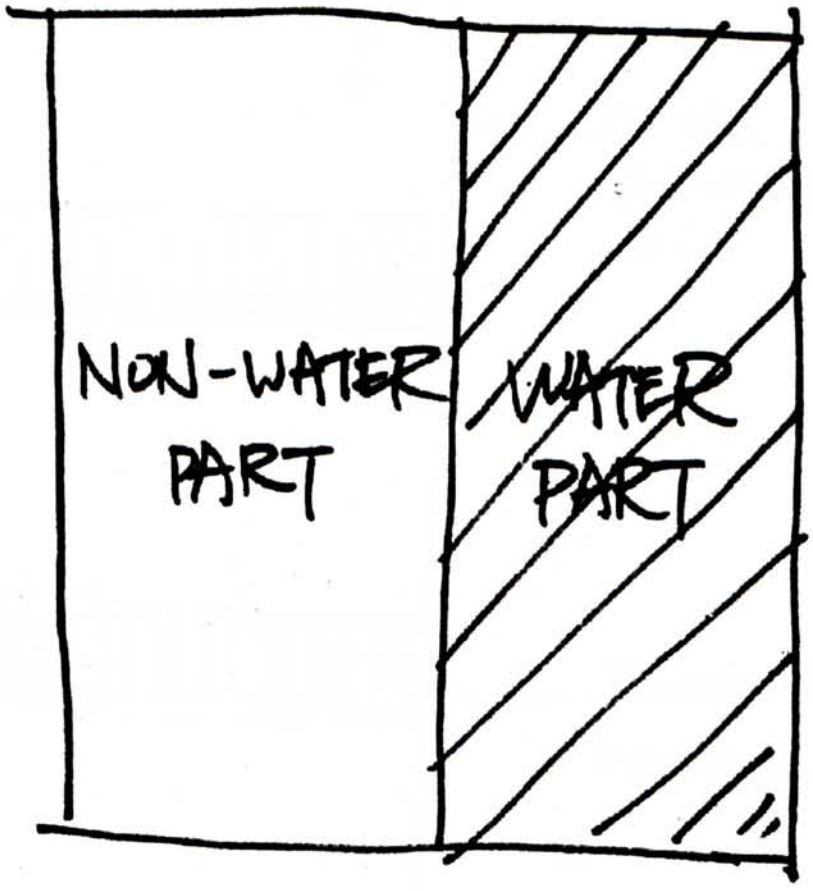
1. Water sports - White water canoeing
   Leisure Swimming
   Water skiing
   Snorkeling
   Scuba Diving

2. Urban entertainment - Shopping
   Live Performance
   Movie
   Dining

8. Revised Proposal of Combination

Vertical Spatial Organization

The "water" part and the "non-water" part of the building is separated into zones vertically.



Advantages

Different spatial requirements for "water" and "non-water" parts

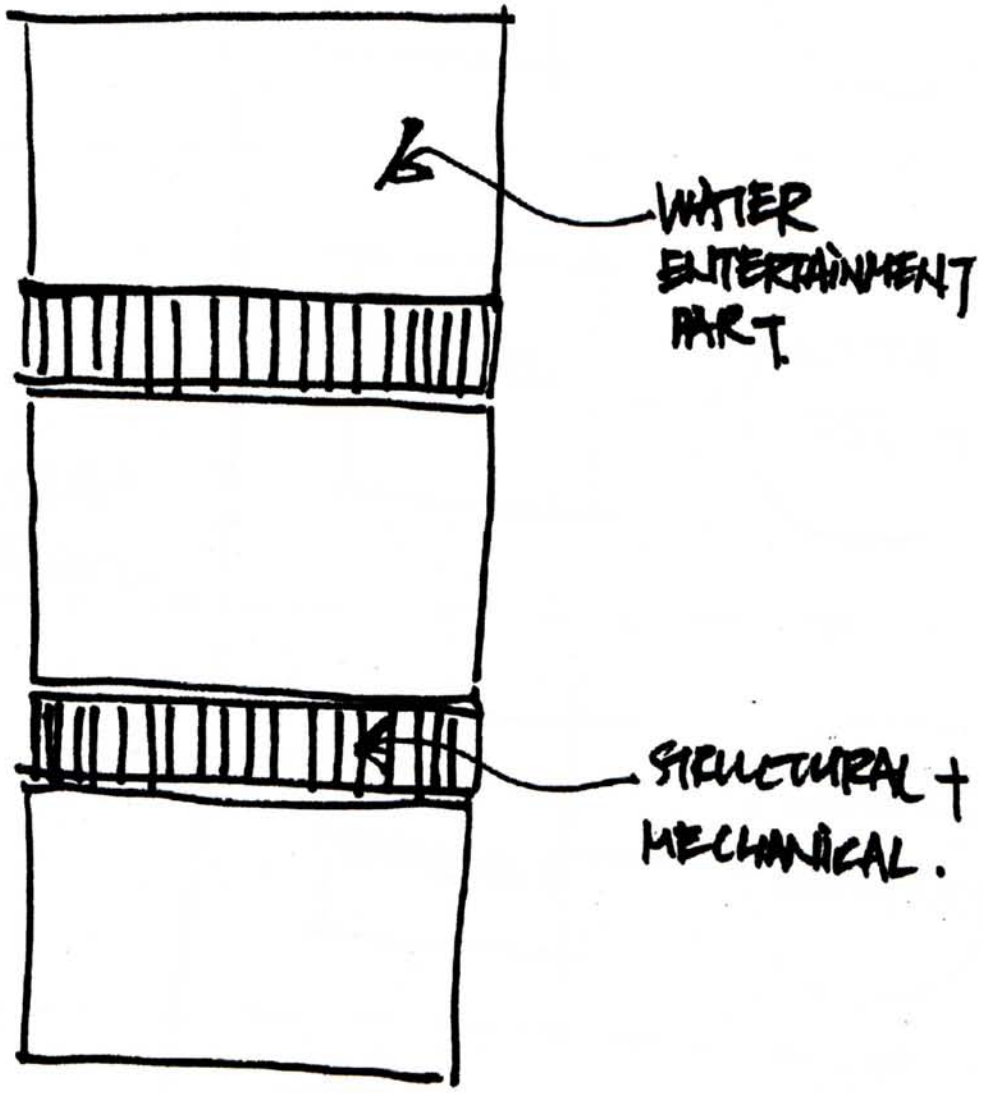
Structural benefit, different span, different height

Easy way finding

8. Revised Proposal of Combination

Horizontal Organization

The building is divided into a number of layers which is separated by the mechanical floor. And within each layer, one kind of water activities will hybrid with one urban entertainment.

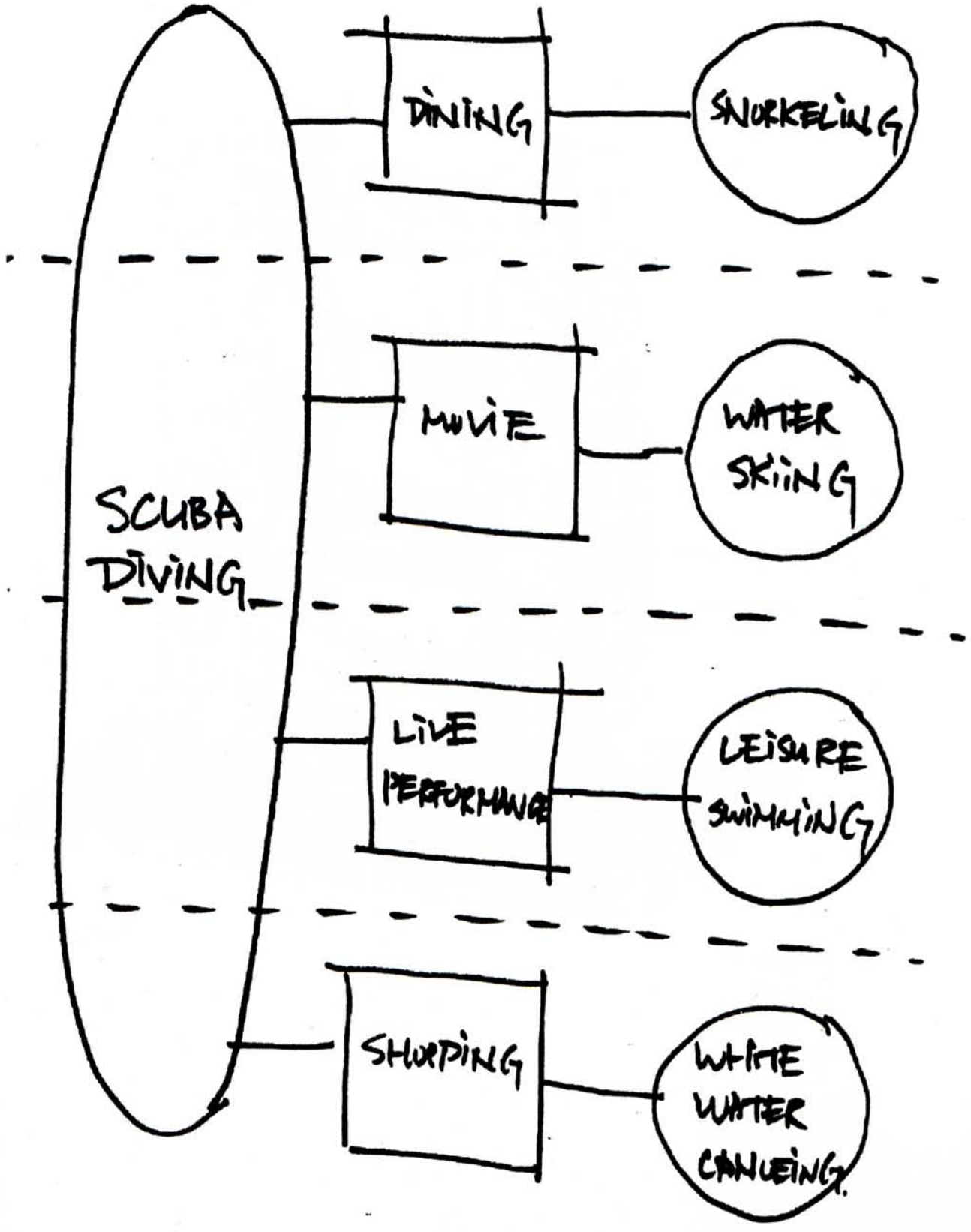


Advantages

Shorter distance for water pumping around the building
The activities are clearly divided inside the building
Structural benefit, heavy structure can be placed layer by layer

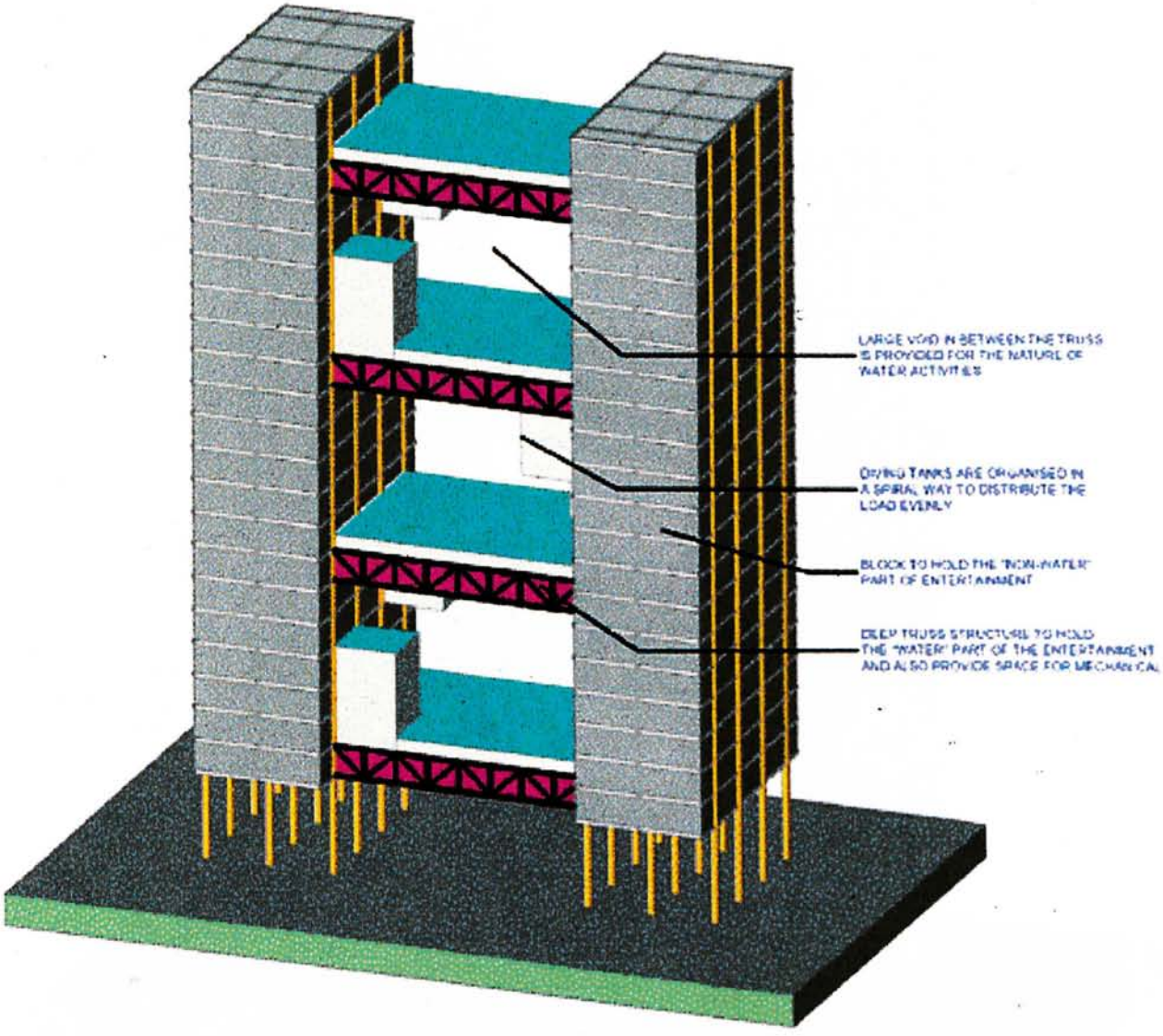
8. Revised Proposal of Combination

Spatial Organization - Bubble Diagram



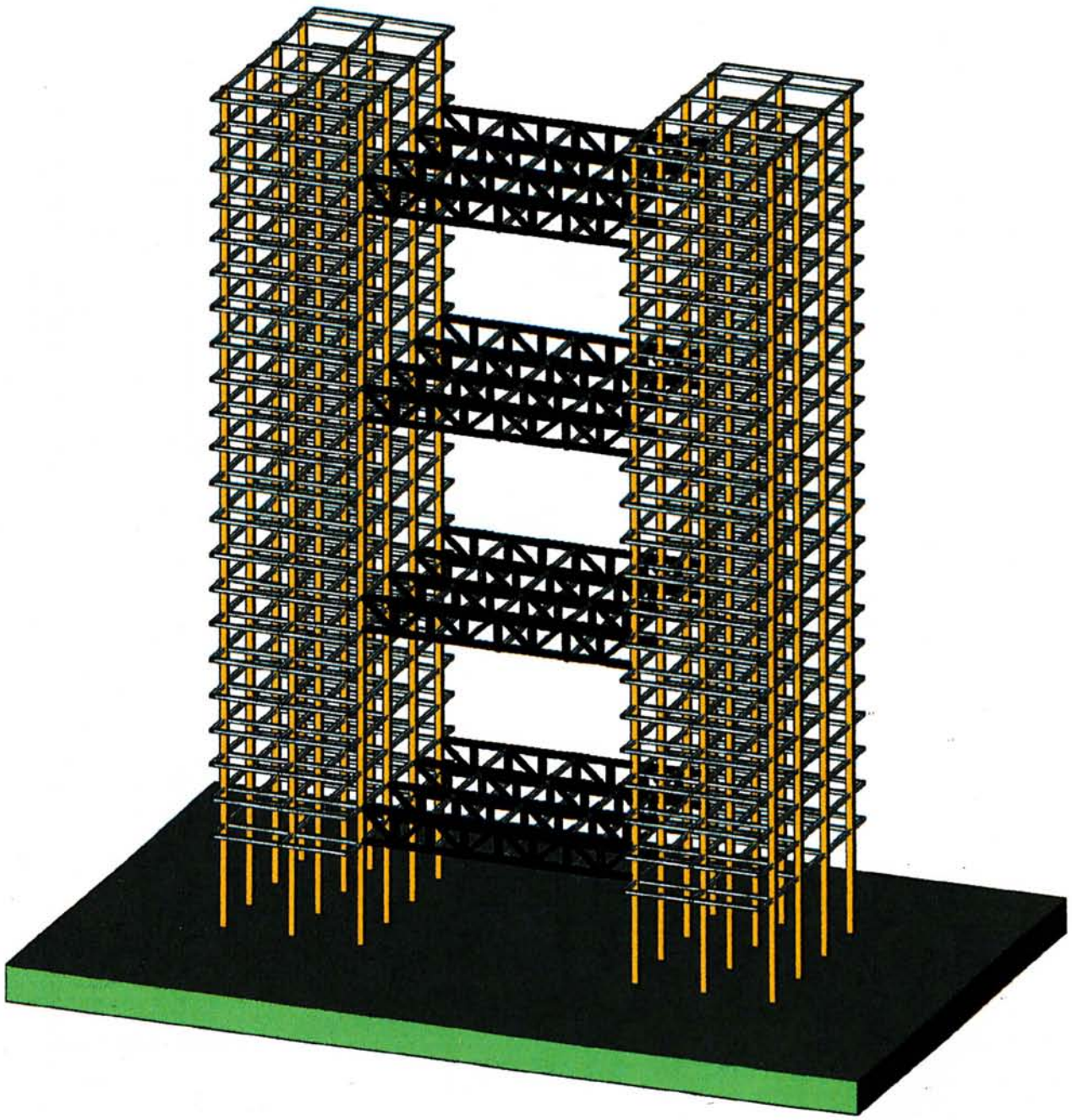
8. Revised Proposal of Combination

Volumatric Organization

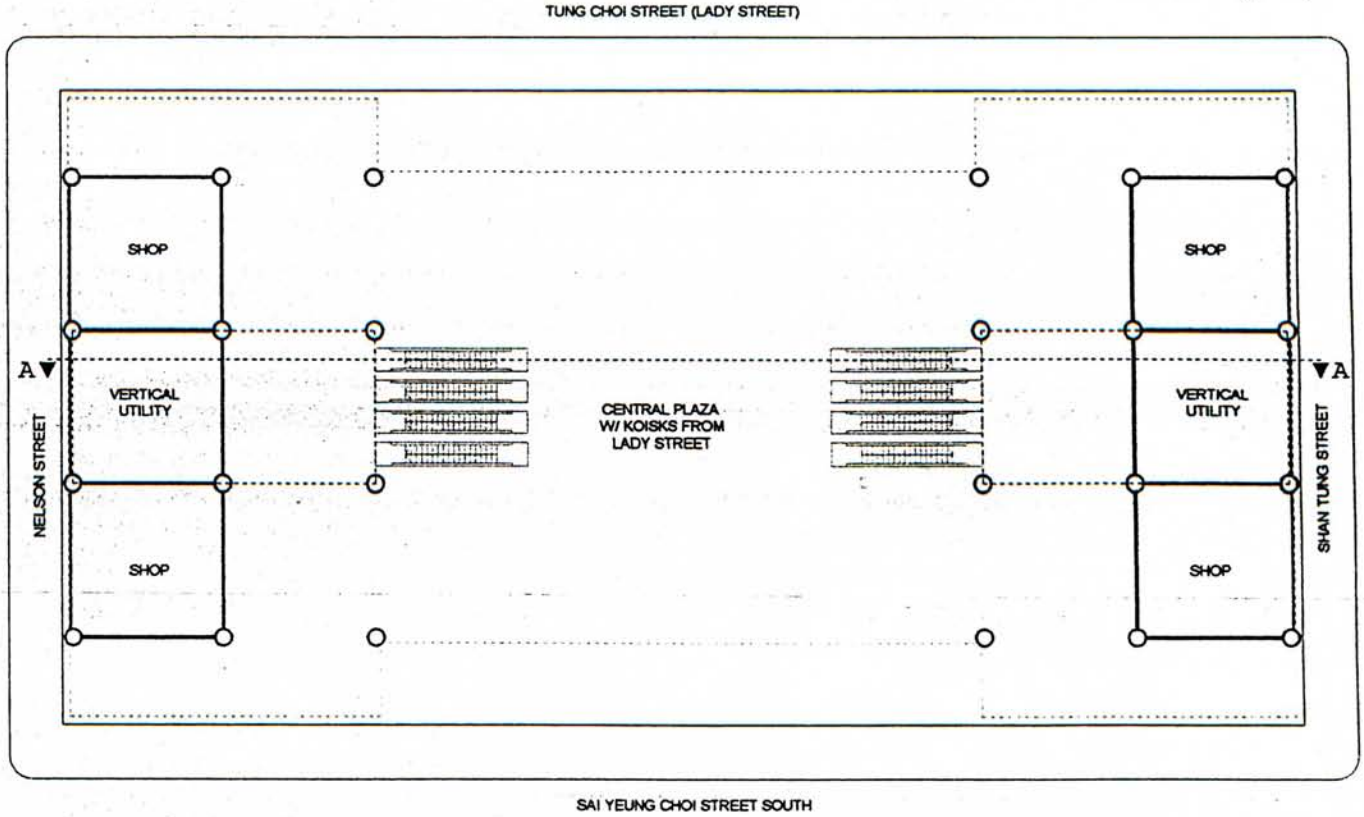


VOLUMATRIC ORGANISATION

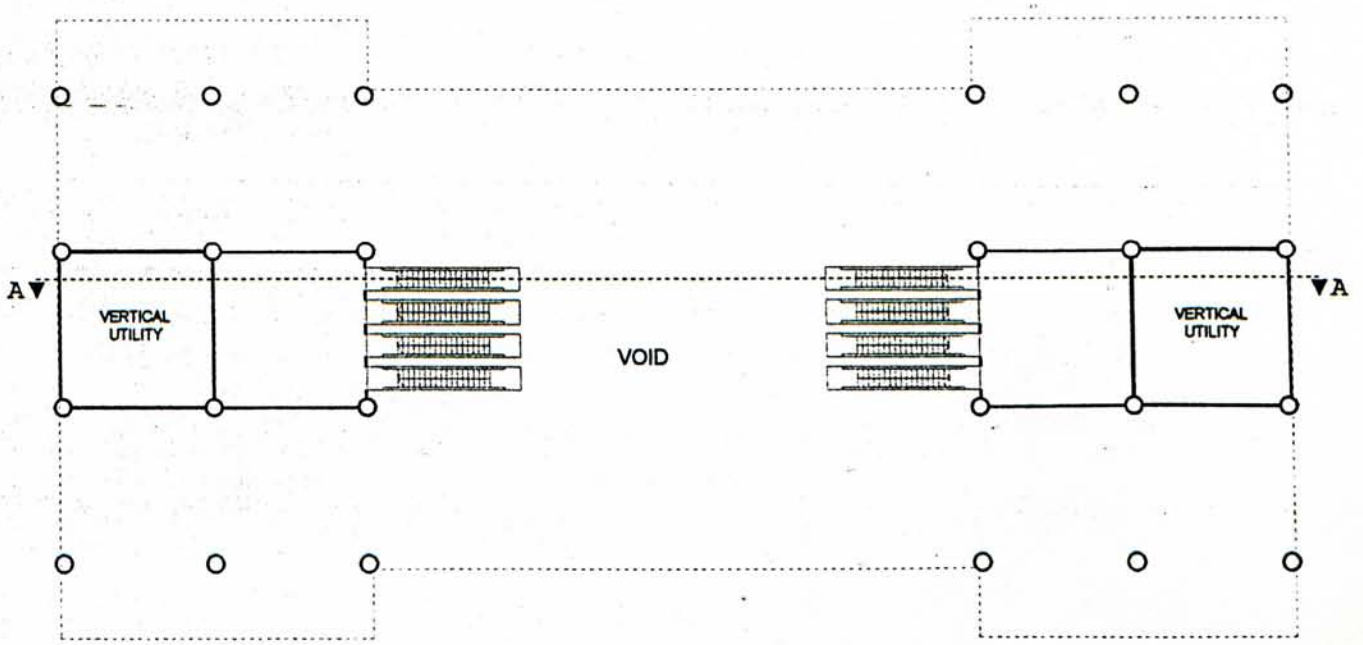
8. Revised Proposal of Combination
   Structural Frame



8. Revised Proposal of Combination
Floor Plans



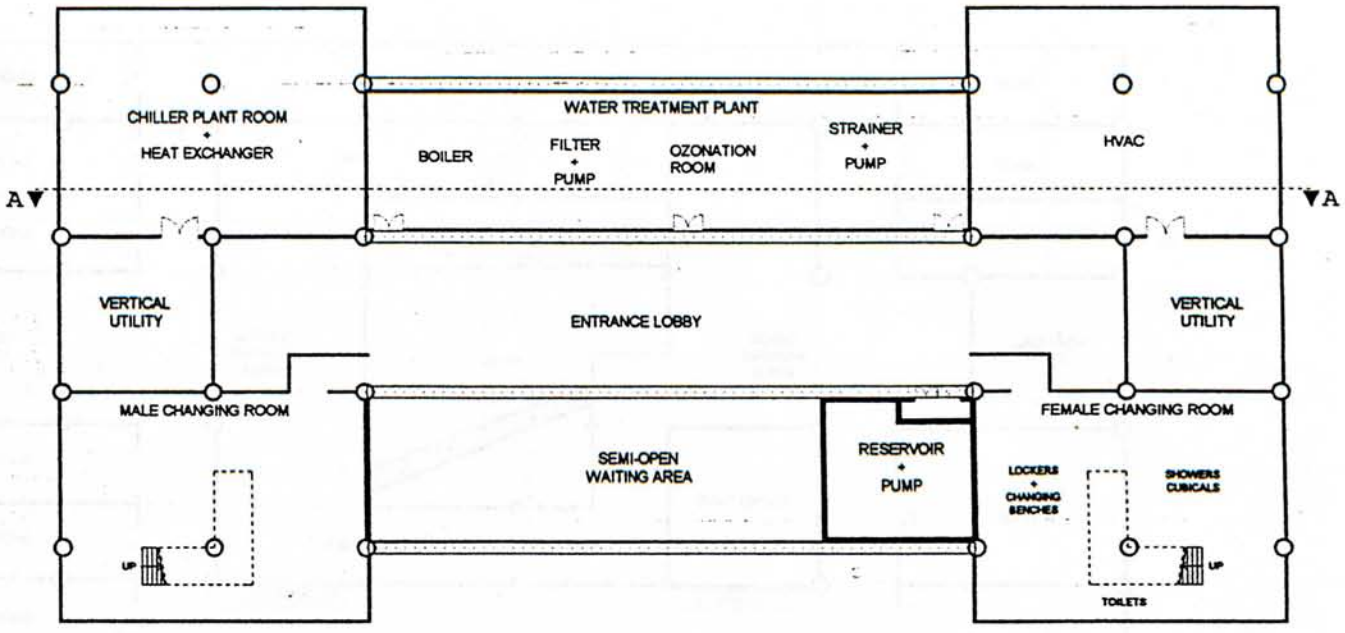
0. G/F PLAN 1:500



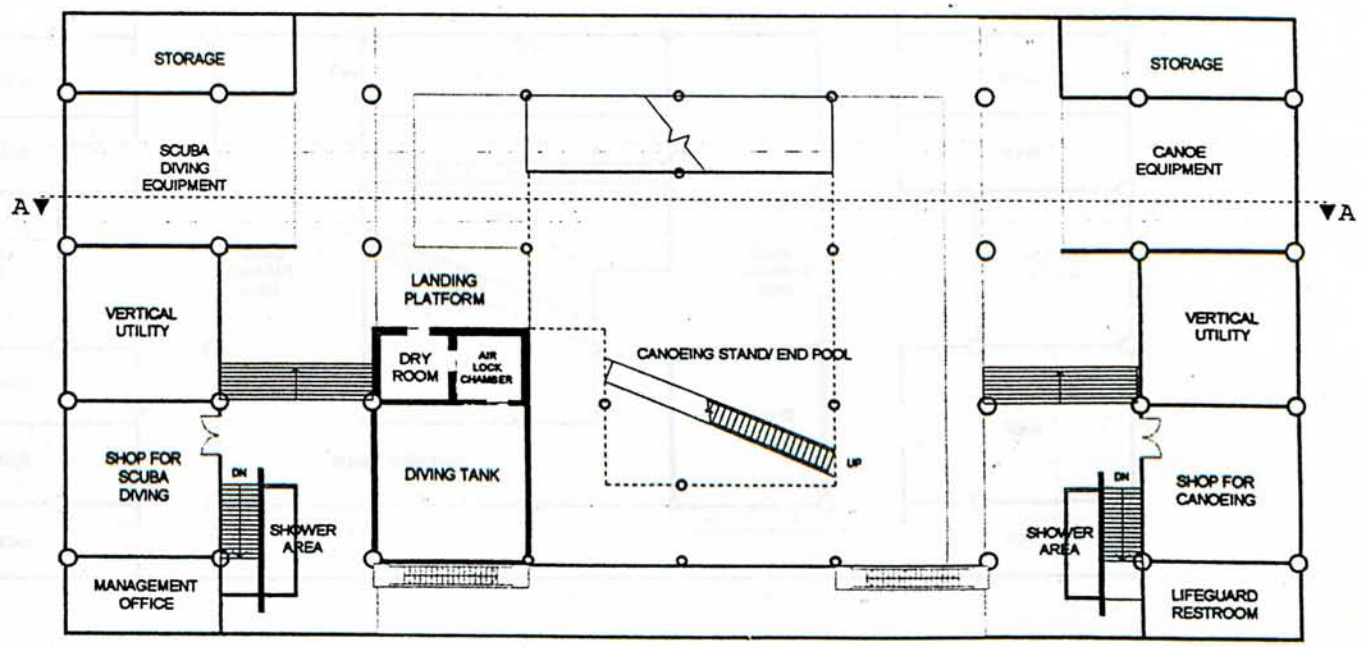
1. ENTRANCE LEVEL PLAN 1:500

8. Revised Proposal of Combination

Floor Plans

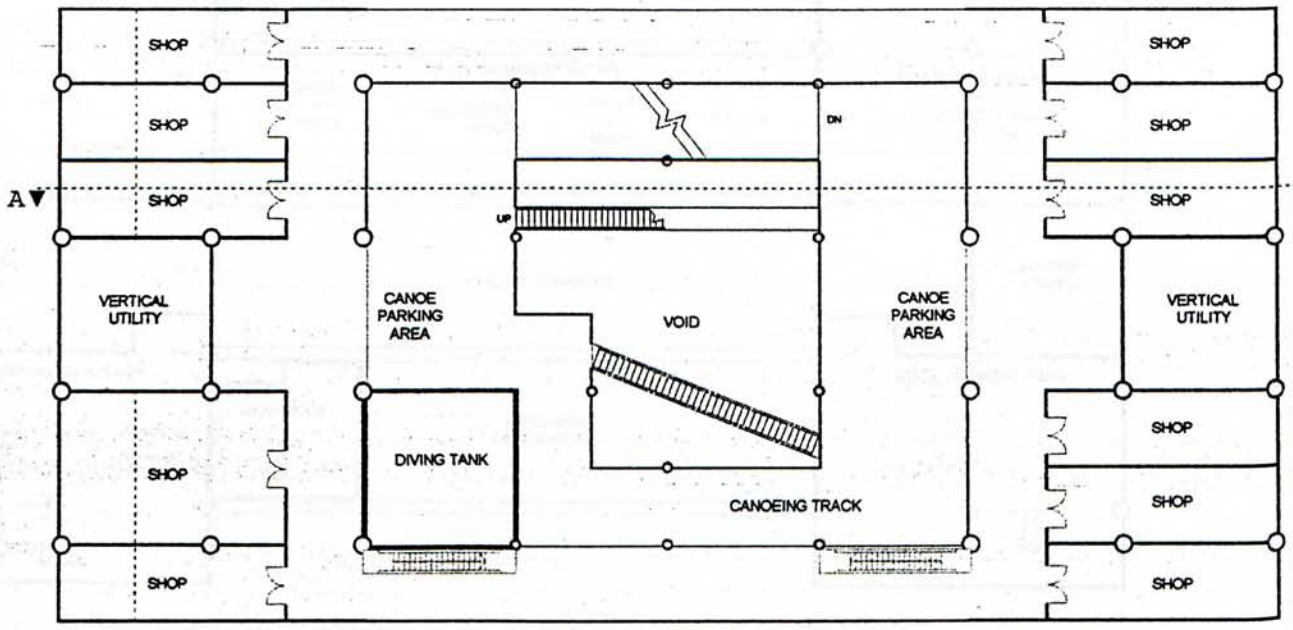


2. MECHANICAL FLOOR PLAN 1:500

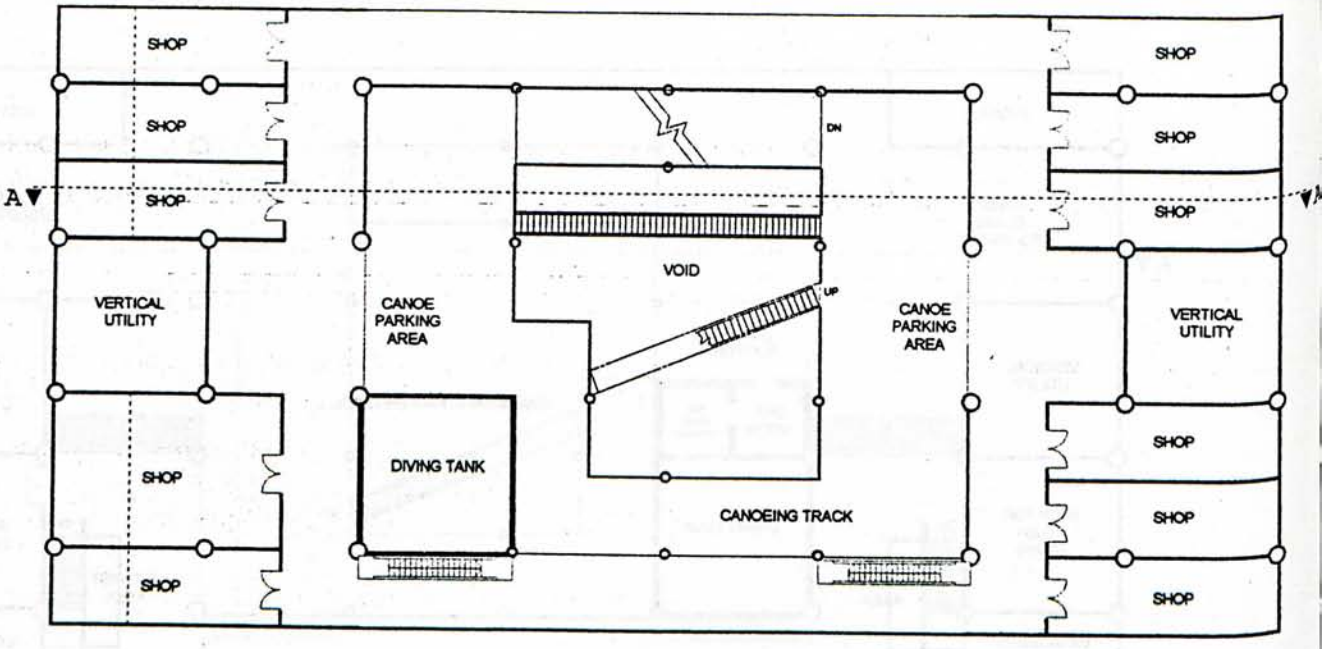


3. CANOEING START/END POOL FLOOR PLAN 1:500

8. Revised Proposal of Combination
   Floor Plans

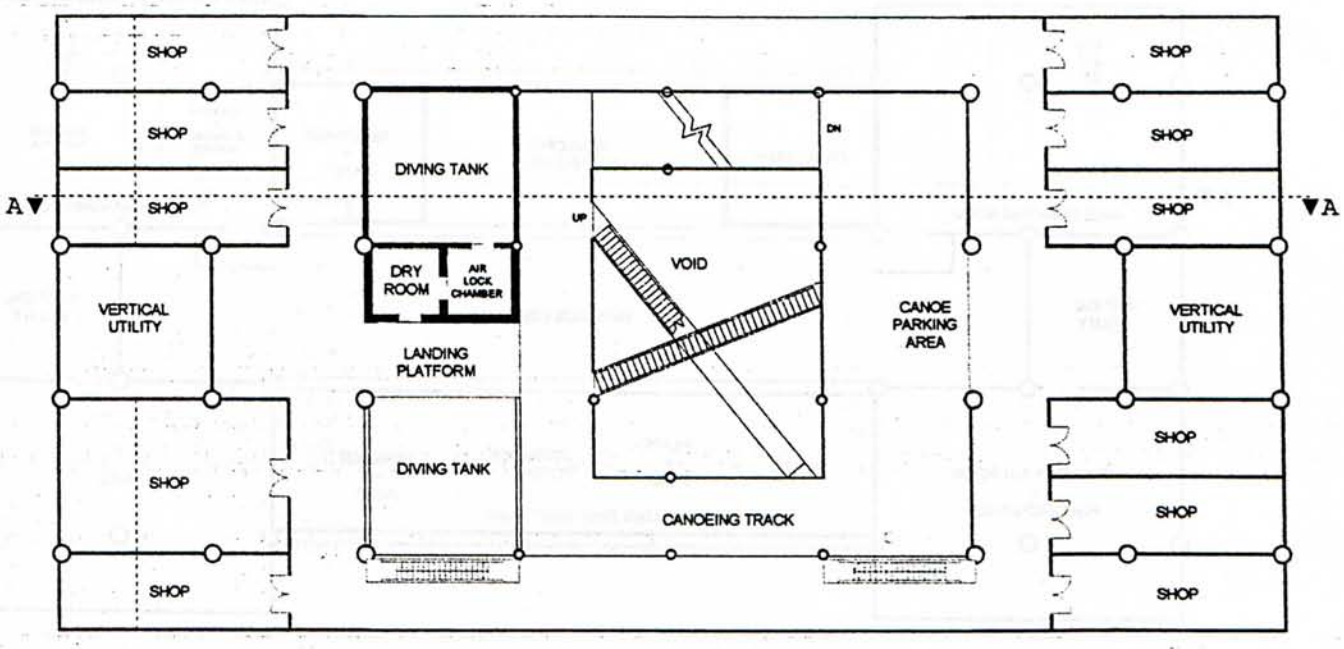


4. SHOPPING FLOOR PLAN 1:500

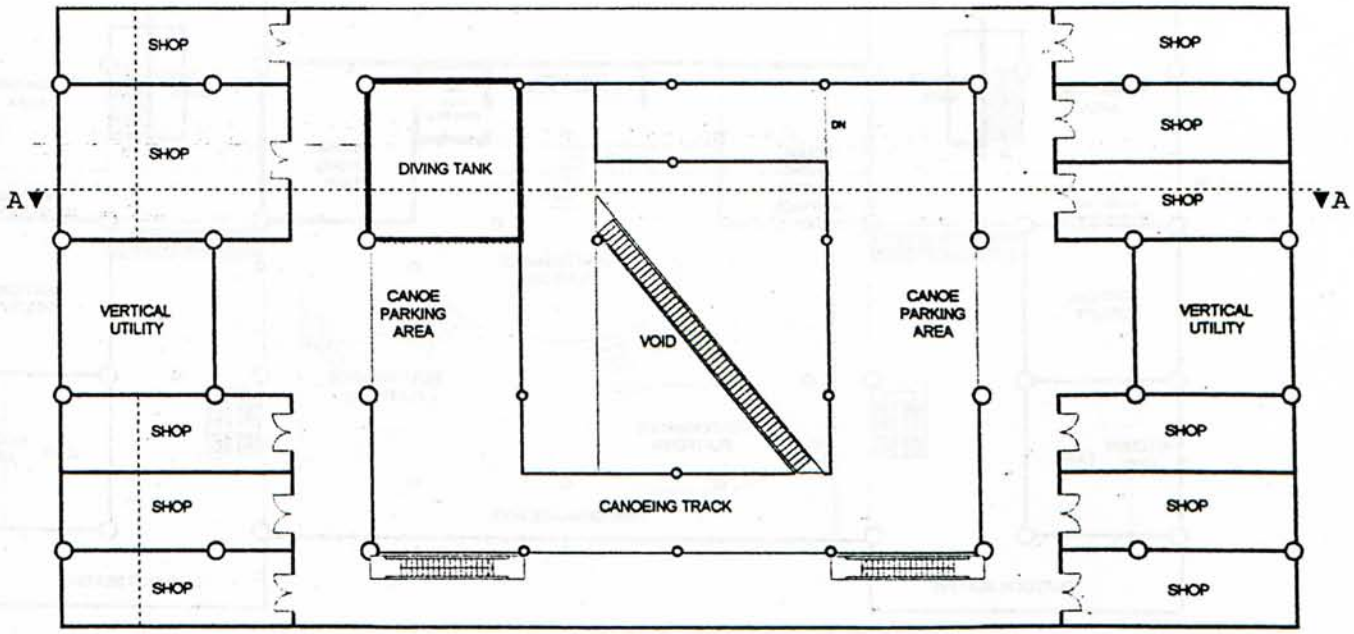


5. SHOPPING FLOOR PLAN 1:500

8. Revised Proposal of Combination
Floor Plans

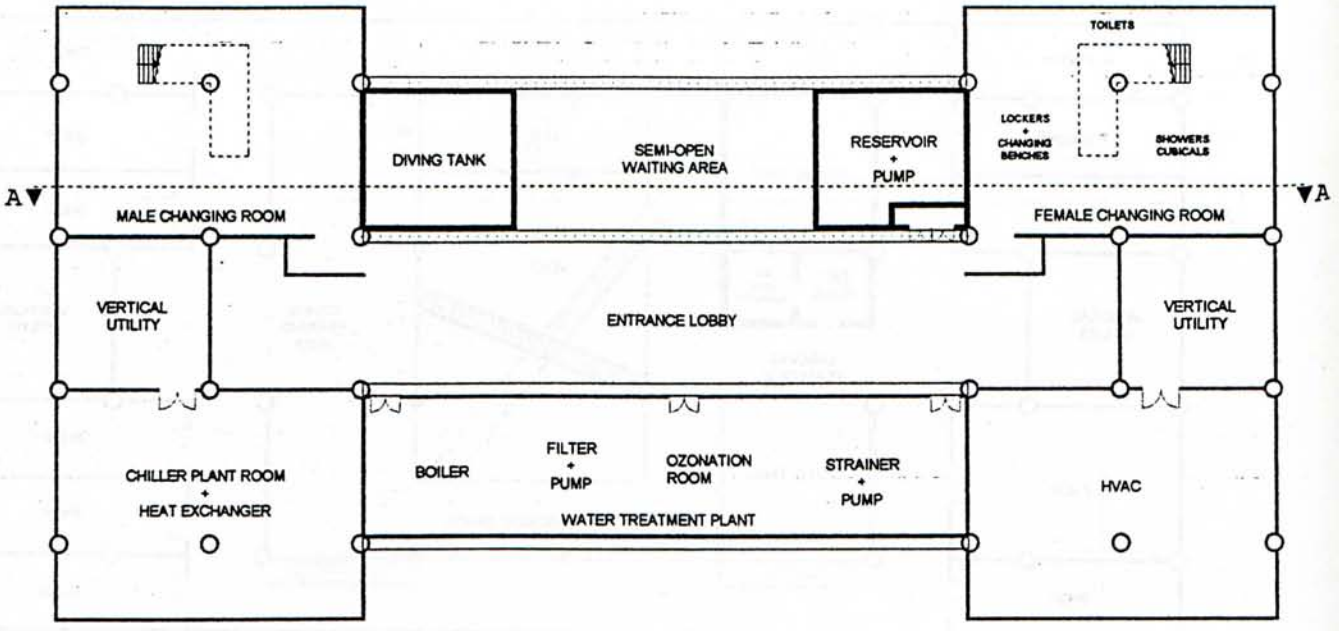


6. SHOPPING FLOOR PLAN 1:500

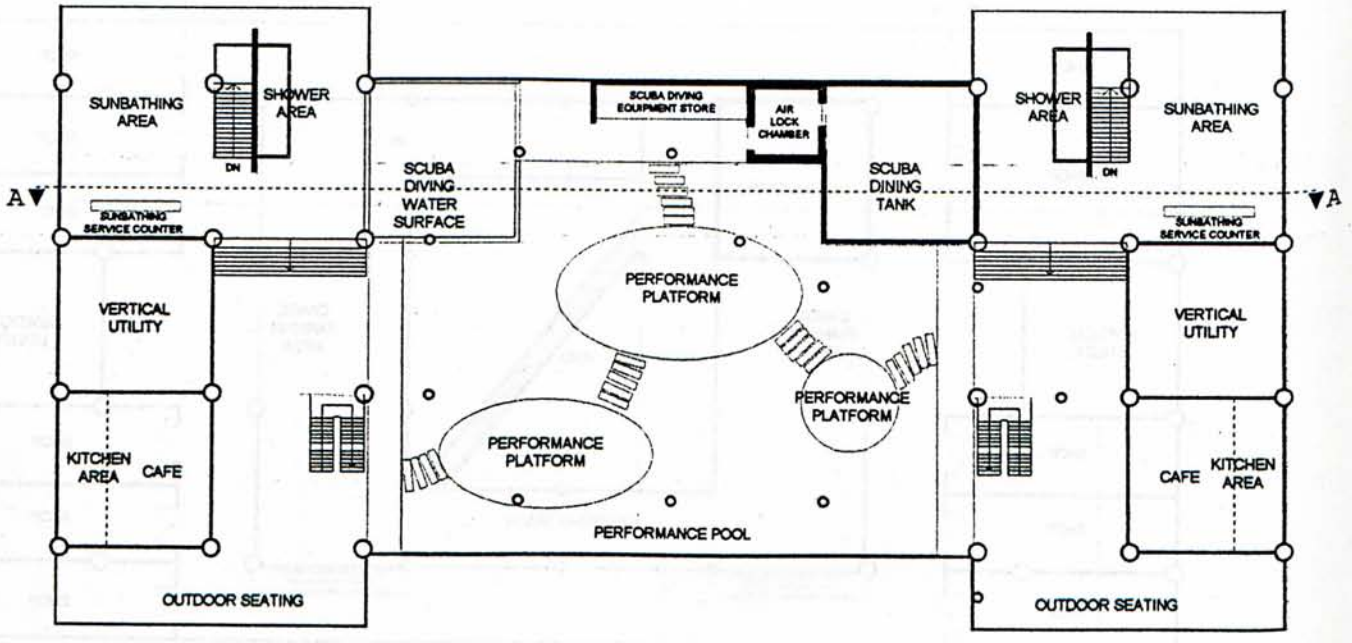


7. SHOPPING FLOOR PLAN 1:500

8. Revised Proposal of Combination Floor Plans

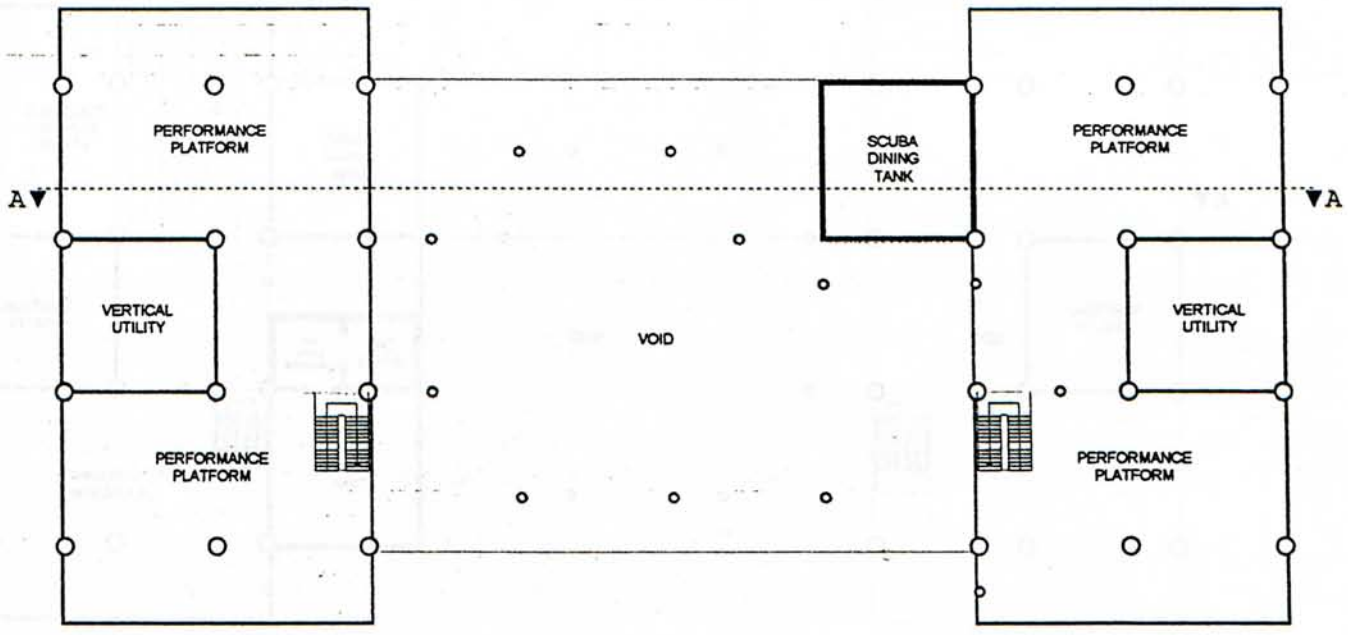


8. MECHANICAL FLOOR PLAN 1:500

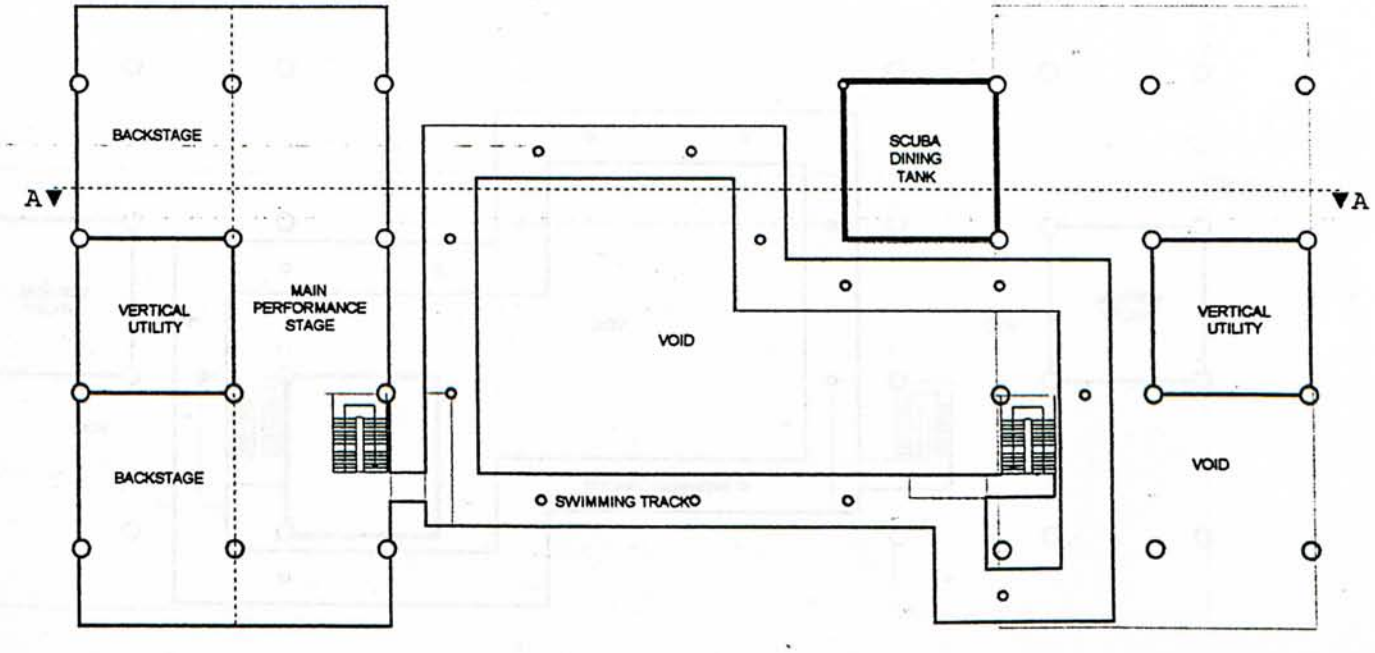


9. PERFORMANCE POOL FLOOR PLAN 1:500

8. Revised Proposal of Combination
Floor Plans

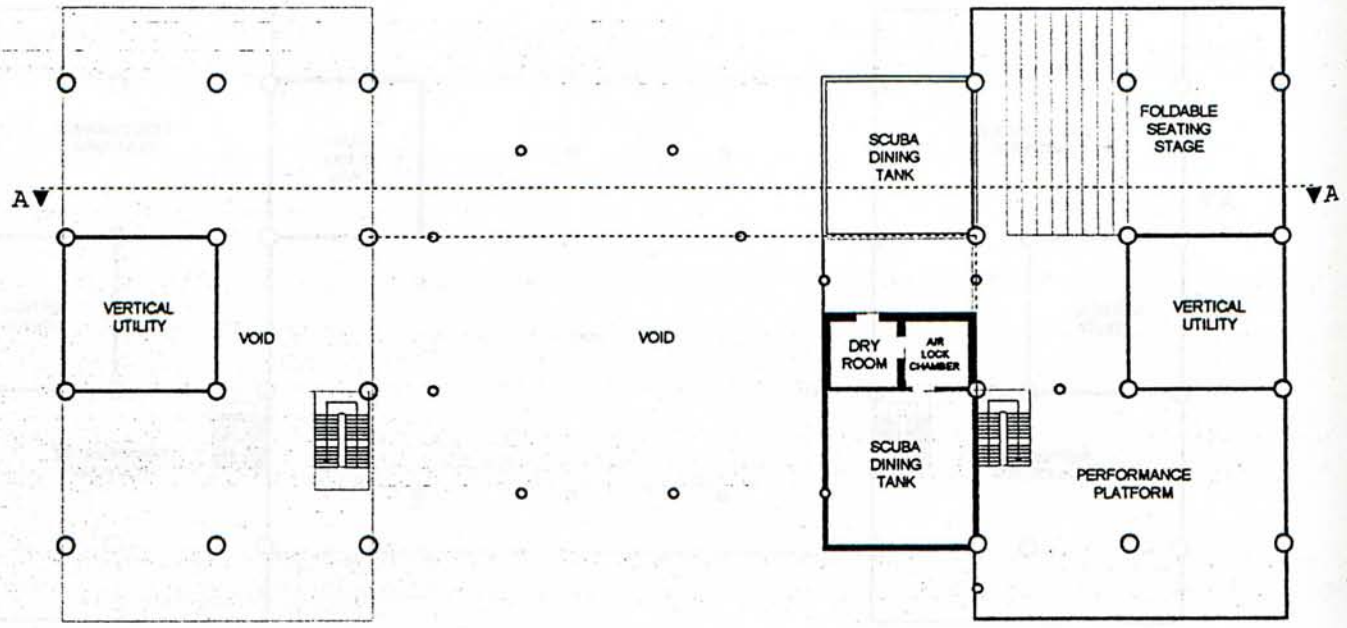


10. PERFORMANCE FLOOR PLAN 1:500

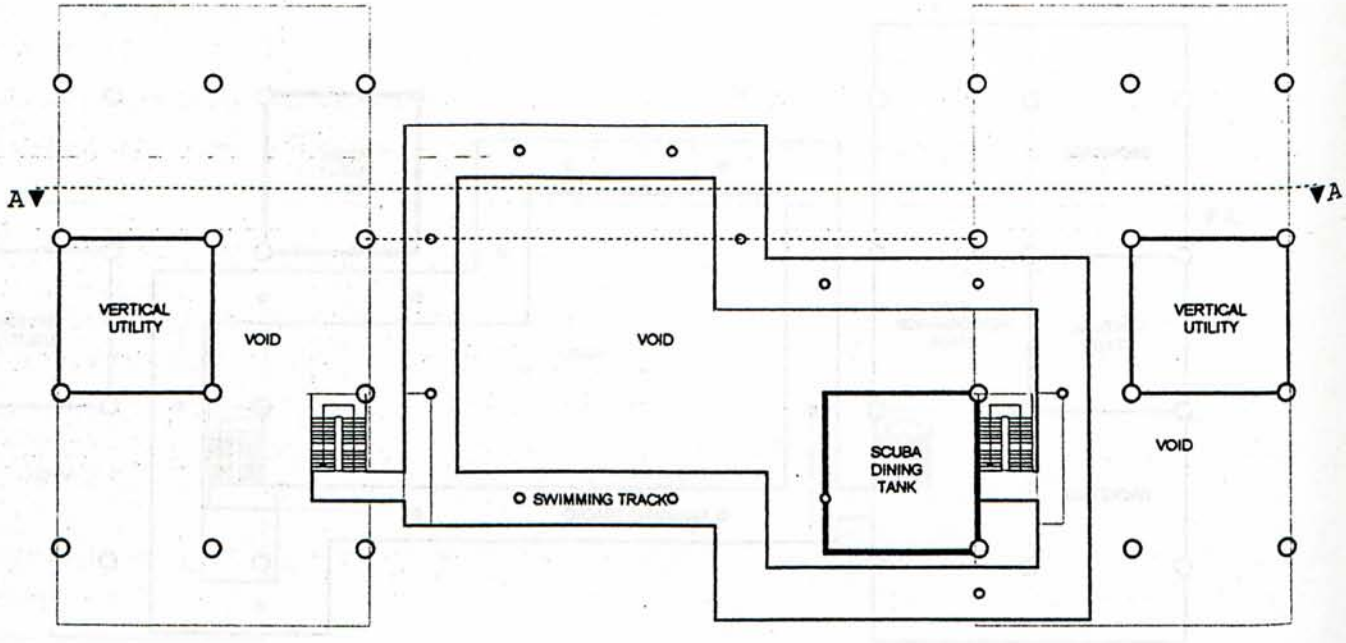


11. PERFORMANCE FLOOR PLAN 1:500

8. Revised Proposal of Combination Floor Plans

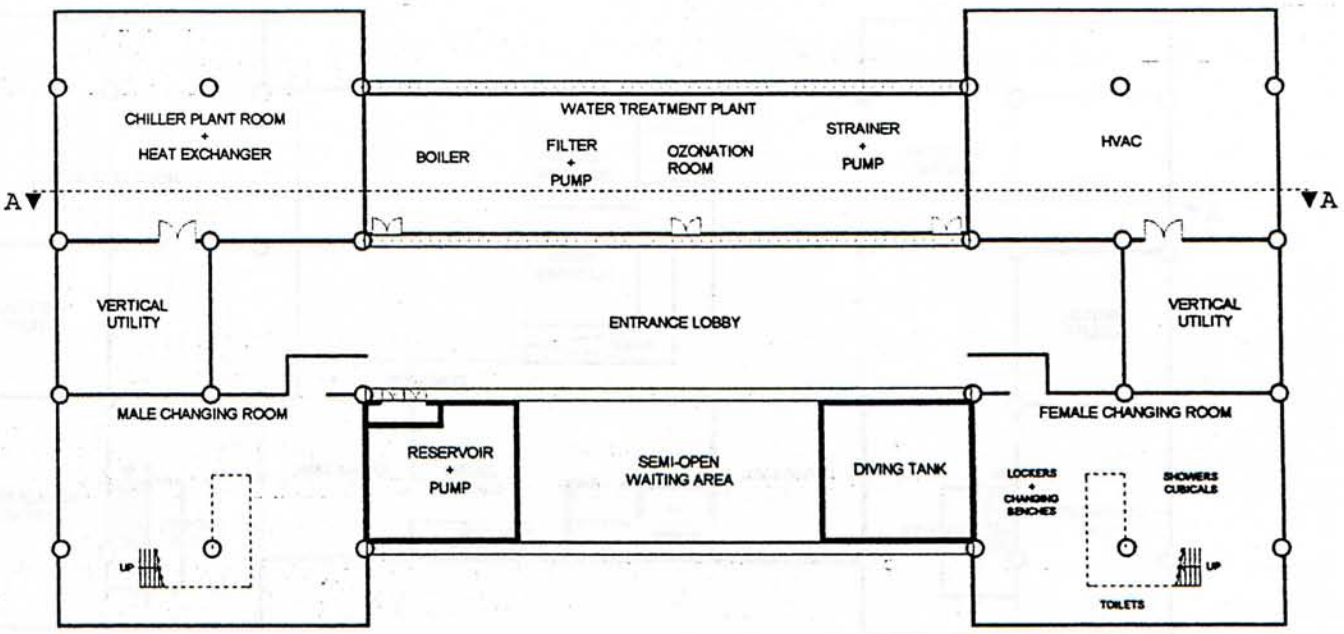


12. PERFORMANCE FLOOR PLAN 1:500

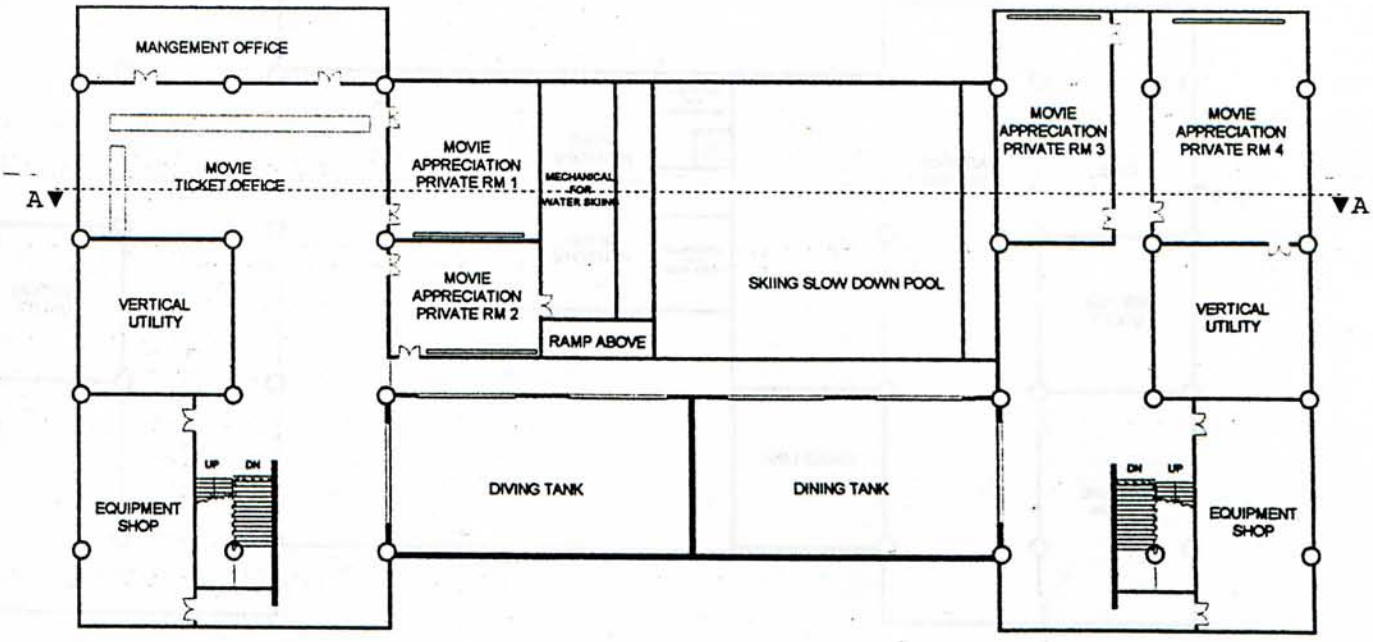


13. PERFORMANCE FLOOR PLAN 1:500

8. Revised Proposal of Combination
   Floor Plans

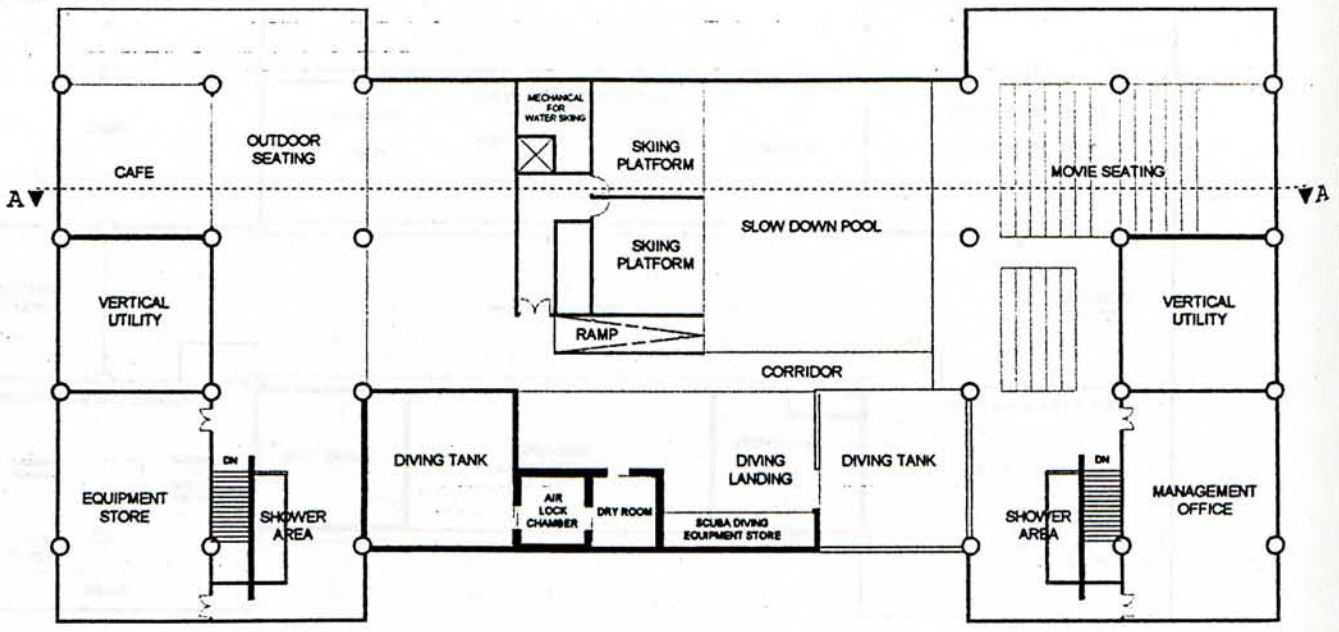


14. MECHANICAL FLOOR PLAN 1:500



15. MOVIE FLOOR PLAN 1:500

8. Revised Proposal of Combination Floor Plans



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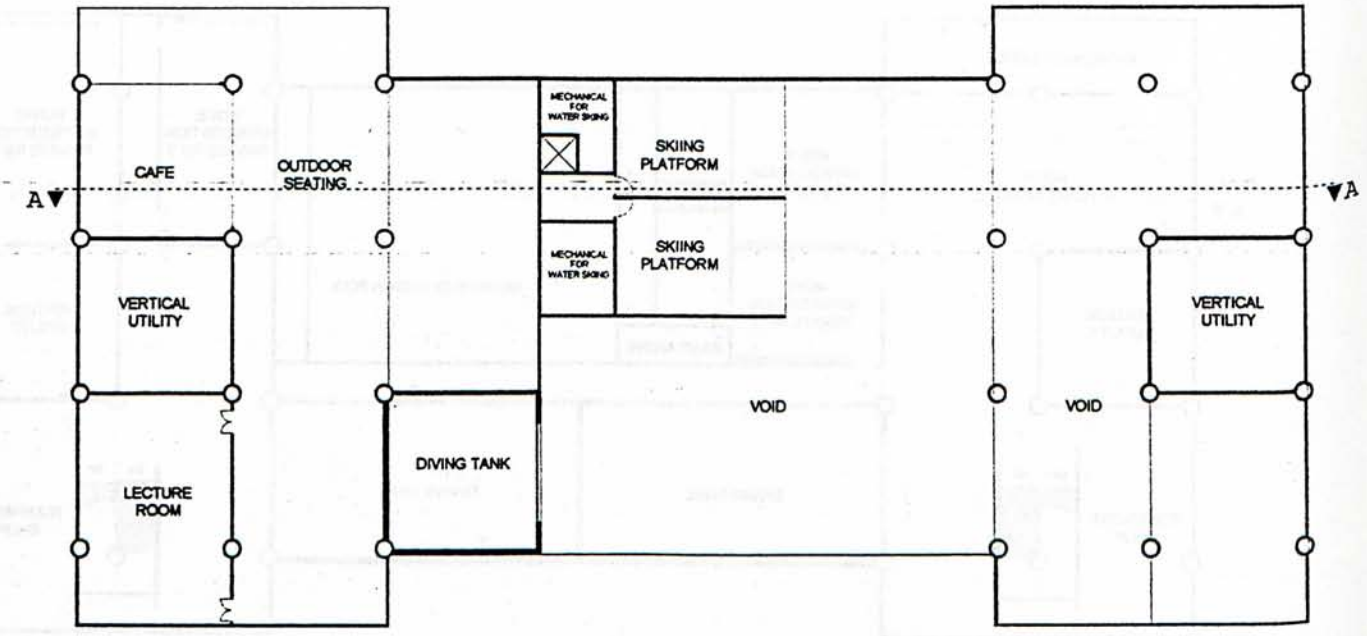
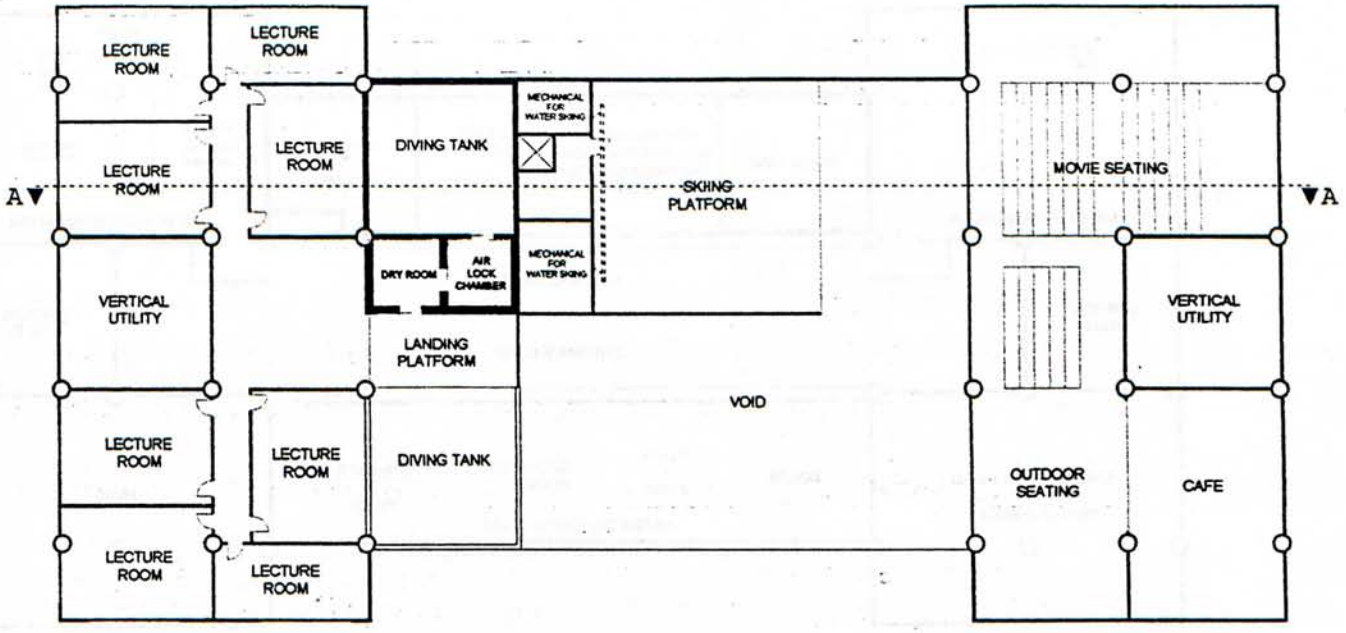


17. MOVIE FLOOR PLAN 1:500

8. Revised Proposal of Combination
   Floor Plans



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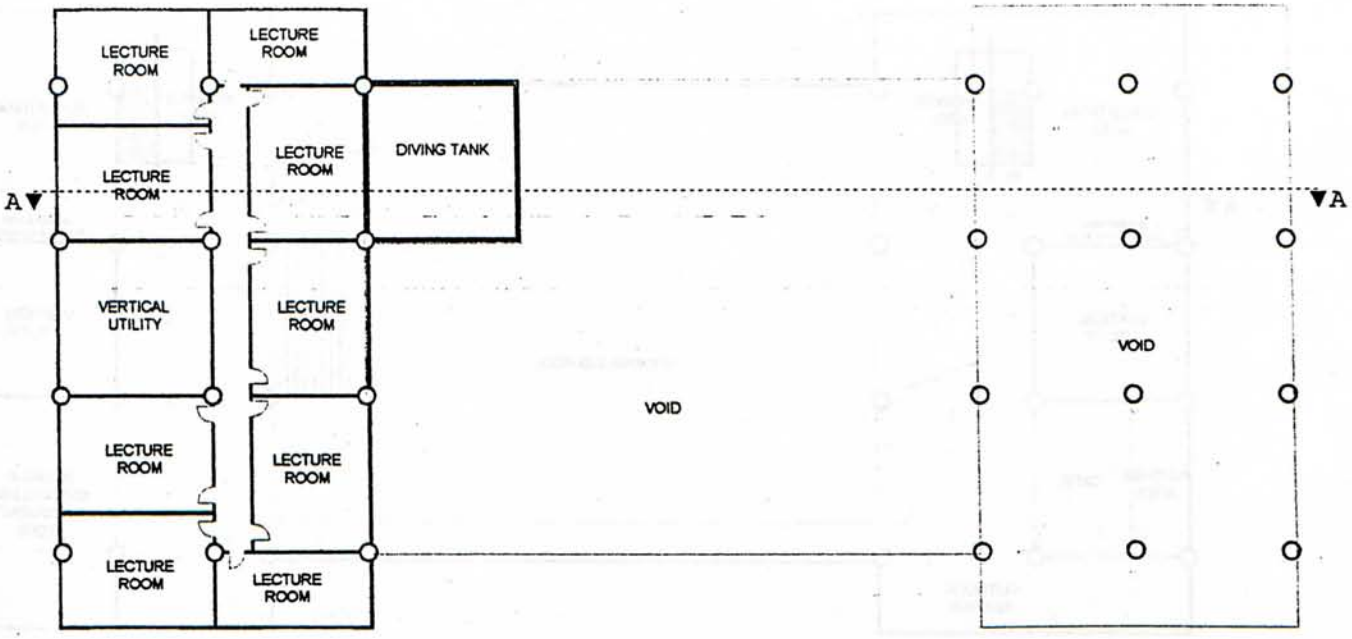
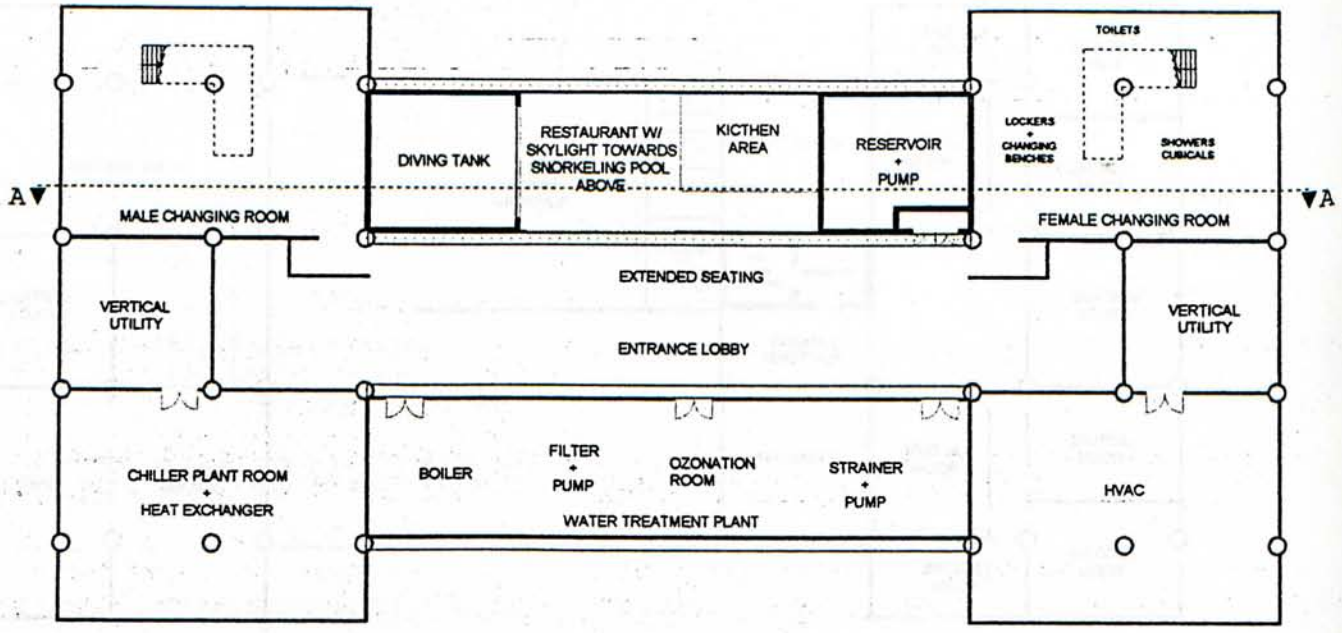
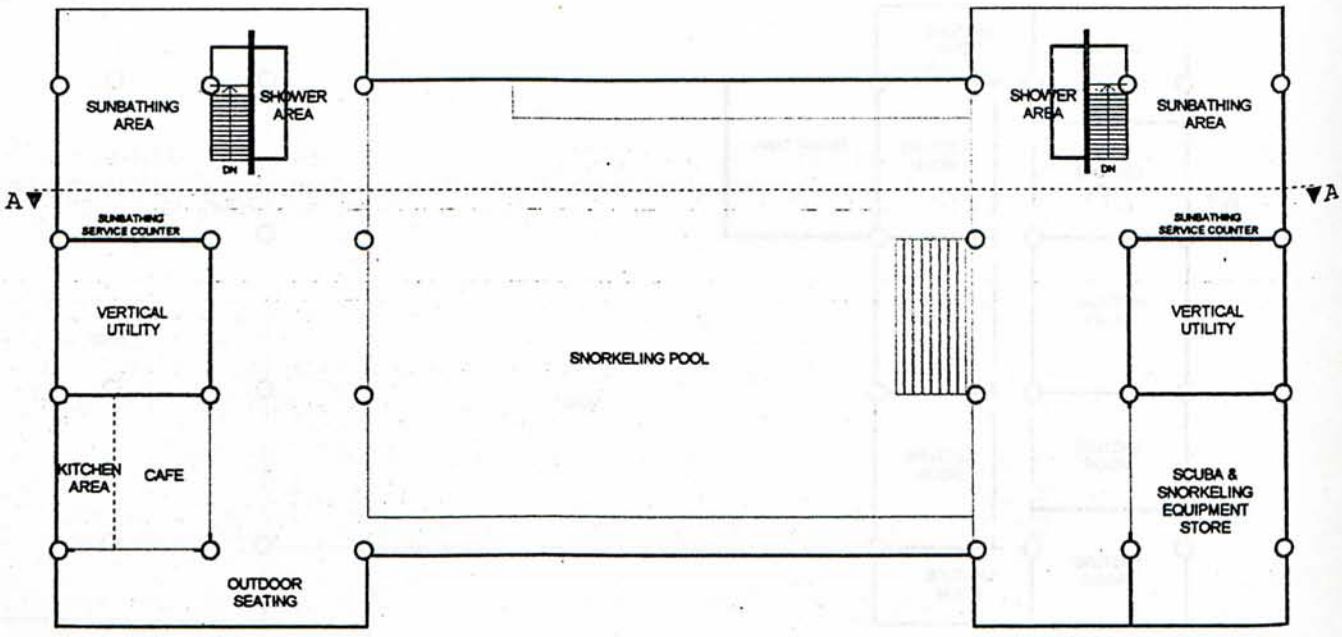


19. MOVIE FLOOR PLAN 1:500

8. Revised Proposal of Combination
   Floor Plans

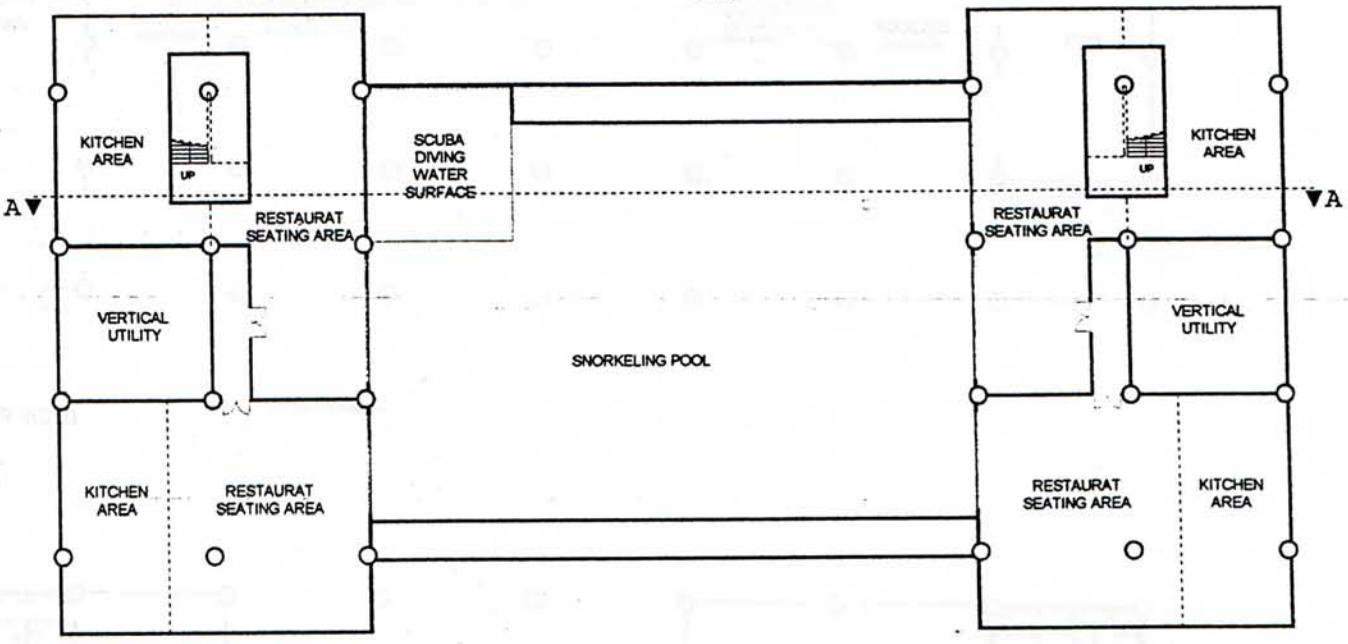


20. MECHANICAL FLOOR PLAN 1:500



22. SNORKELING FLOOR PLAN 1:500

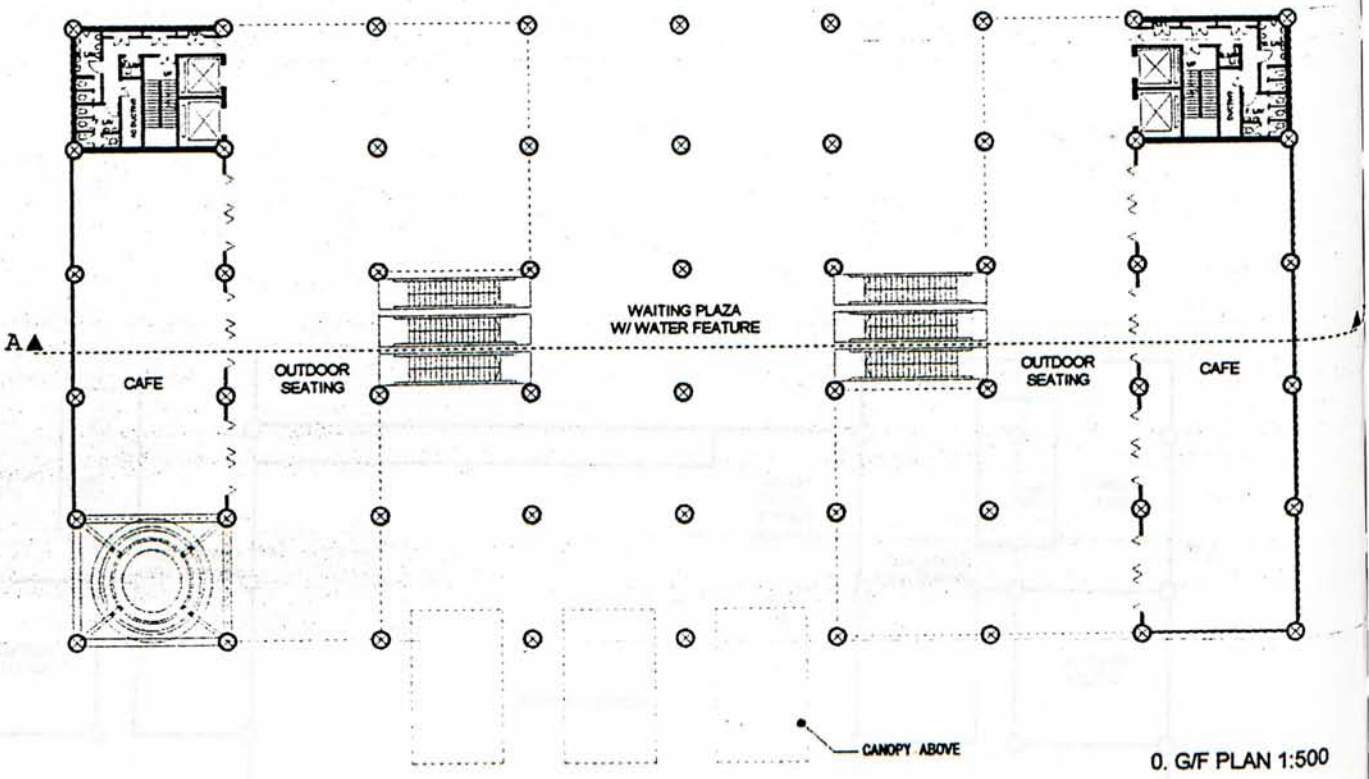
8. Revised Proposal of Combination
   Floor Plans



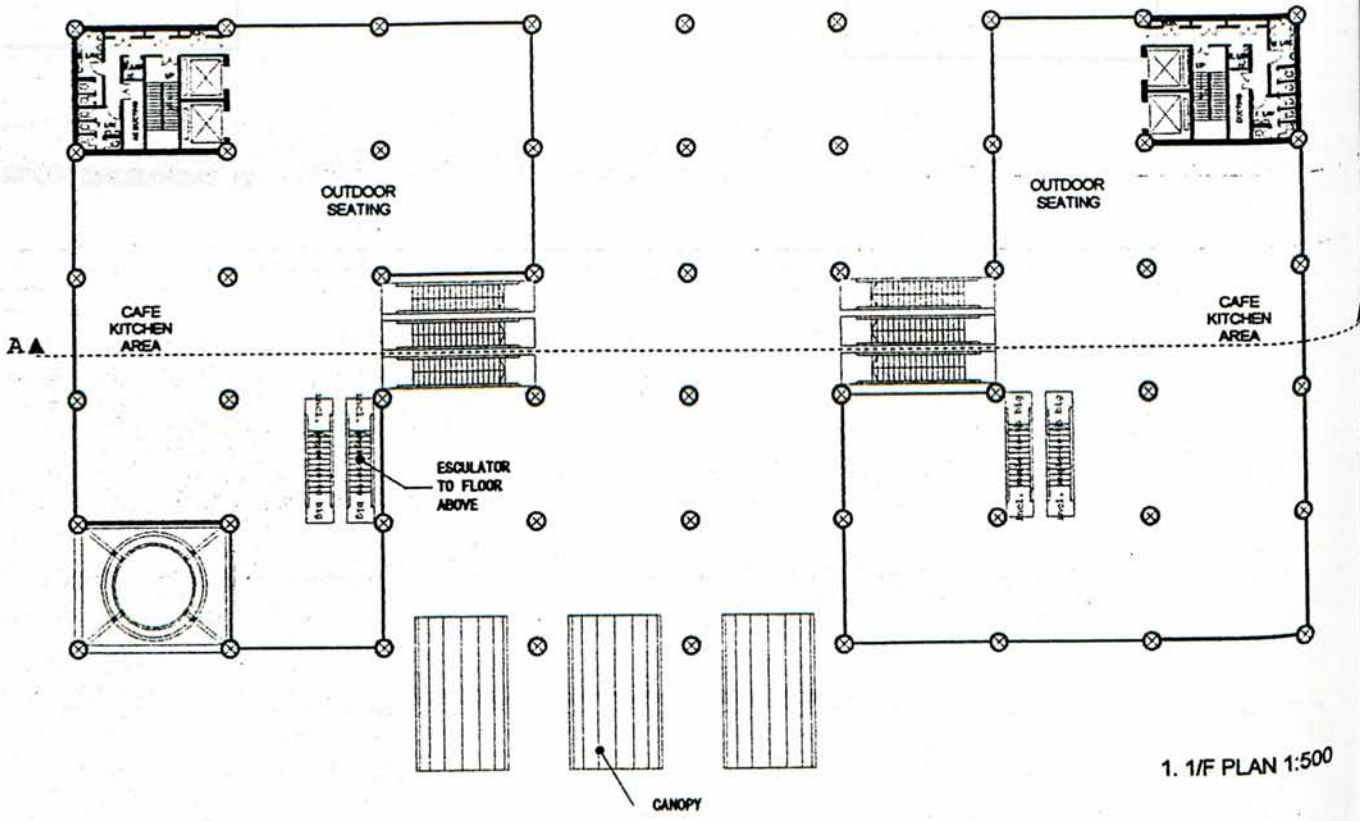
21. SNORKELING FLOOR PLAN 1:500

9. Design Refine

Floor Plans

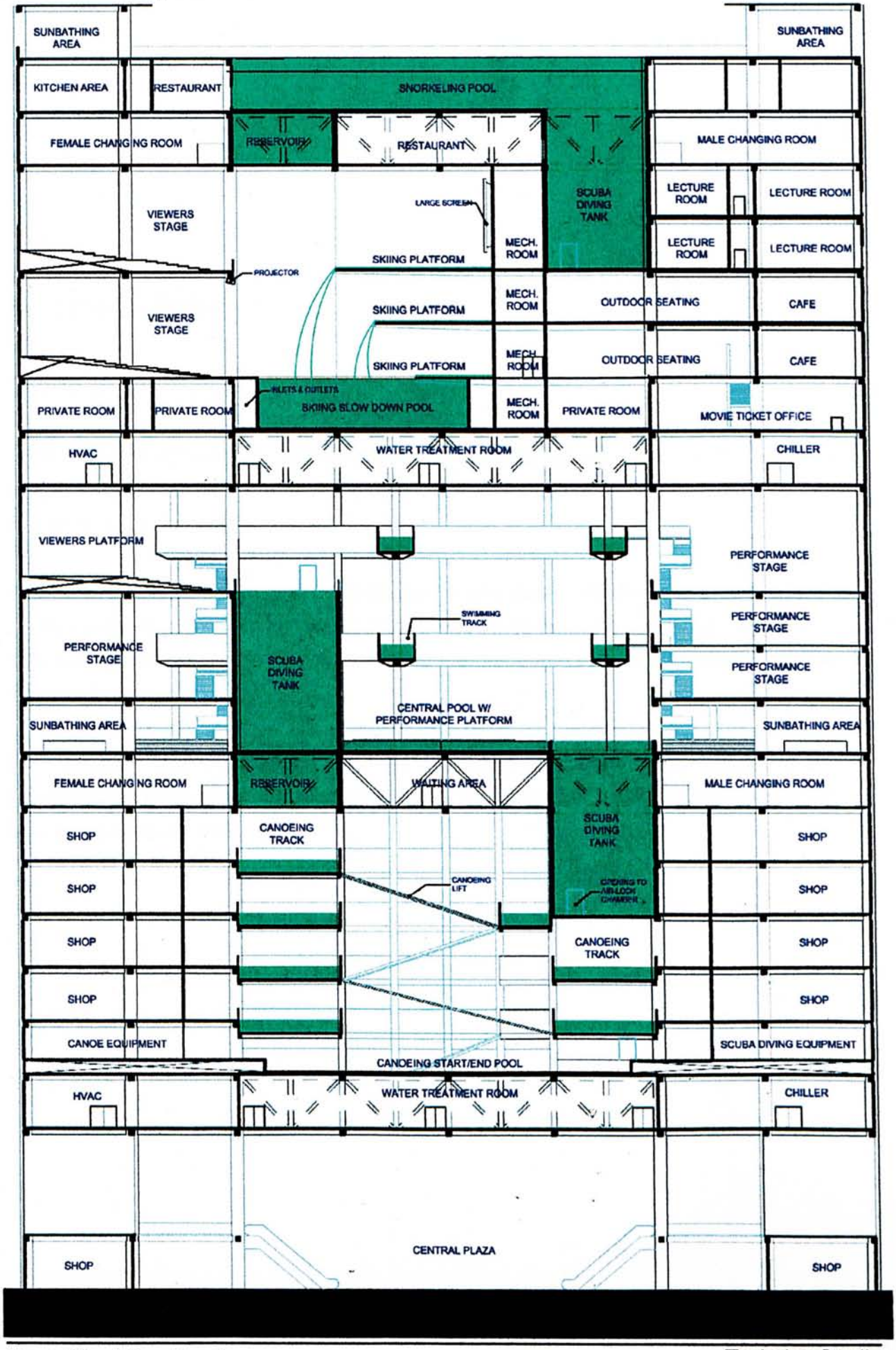


0. G/F PLAN 1:500



1. 1/F PLAN 1:500

8. Revised Proposal of Combination - Section



9. Design Refine

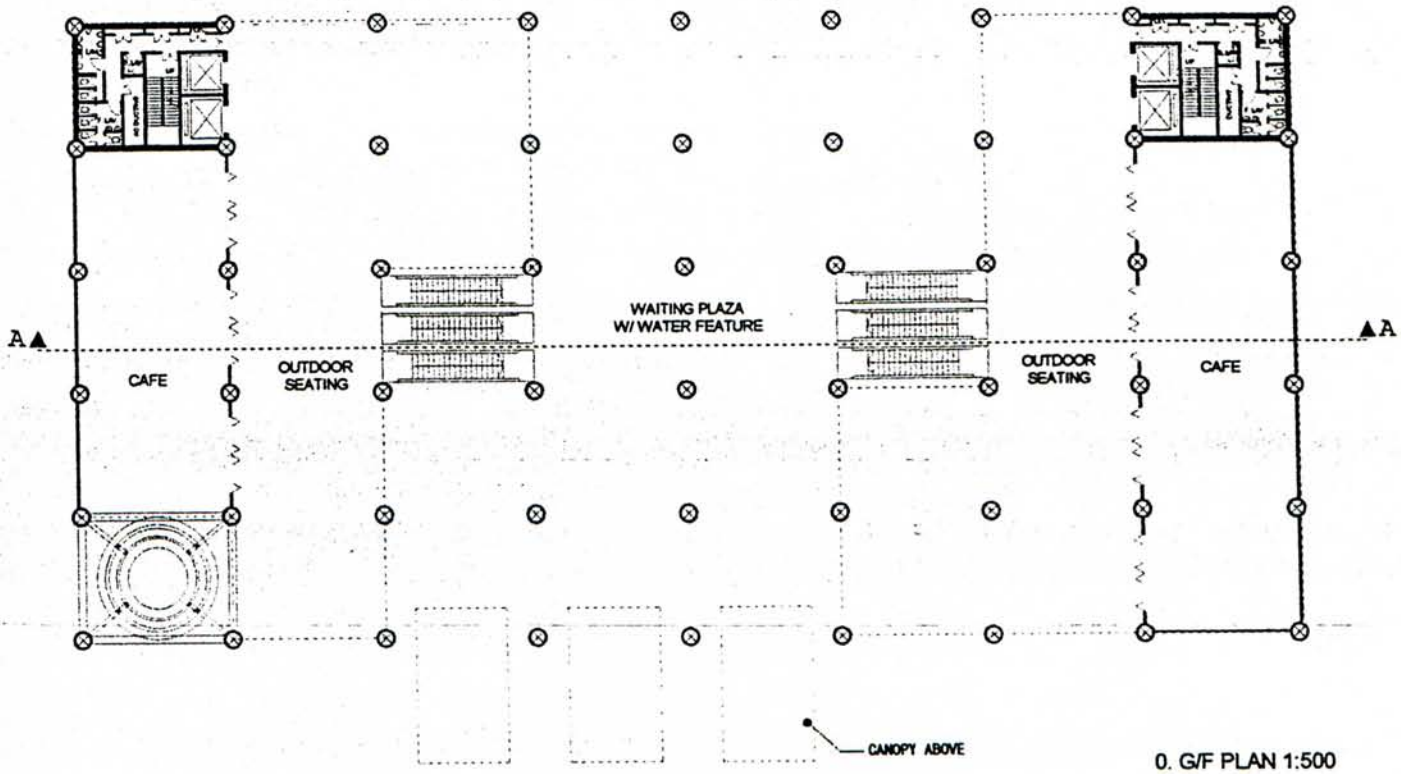
Spatial Organization

In the previous scheme, the heaviest thing, water, was placed in the weakest part of the structure, and also the water surfaces are overlapped by each other to block the daylight and form uncomfortable pools.

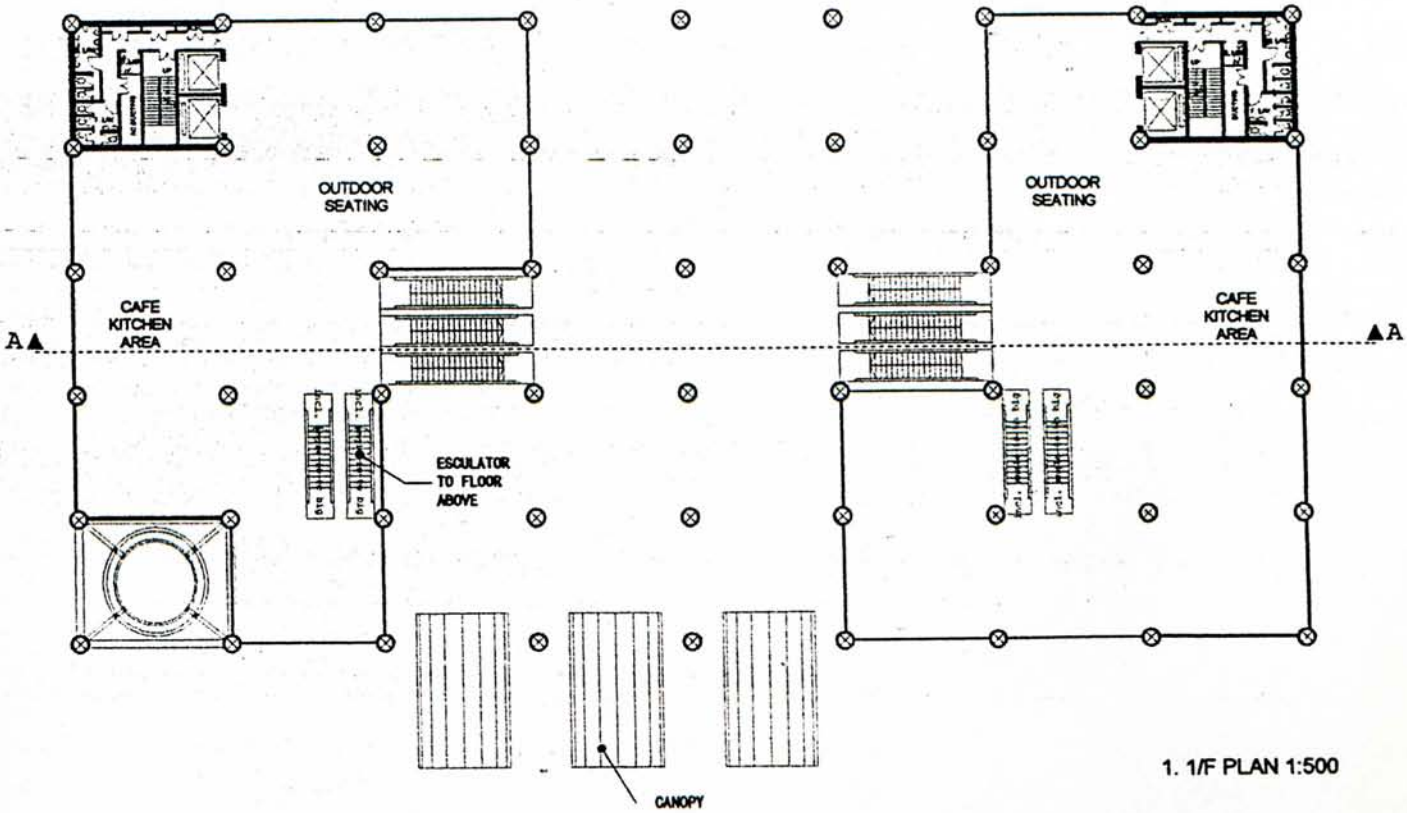
In this scheme, in order to give unobstructed pools, assuming the pool area is equal to the plot area. And by dividing this pool area and rising up them in difficult level, the different volume under the pool will become the place for urban entertainment activities for hybridizing.

The vertical spatial organization is similar to the previous scheme, e.g. the shops are distributed on both sides of the central atrium, and in higher level, the dining area will take place on both sides.

9. Design Refine
   Floor Plans



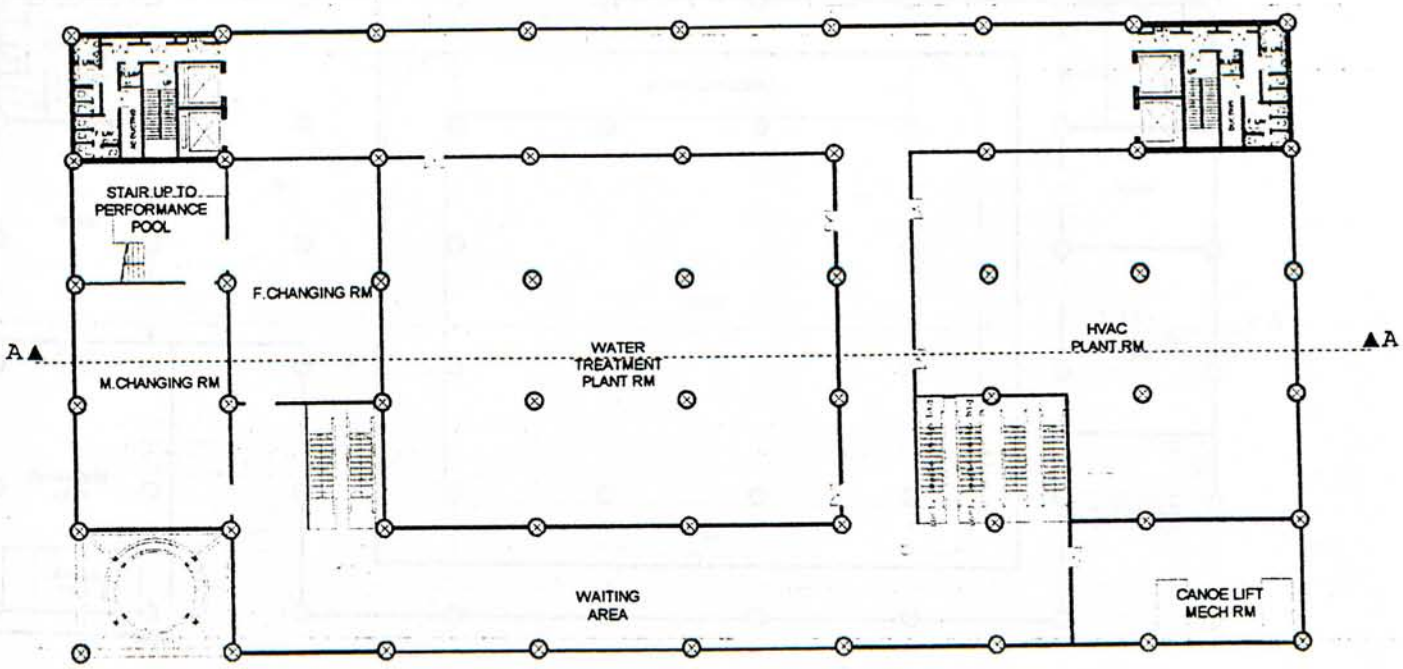
0. G/F PLAN 1:500



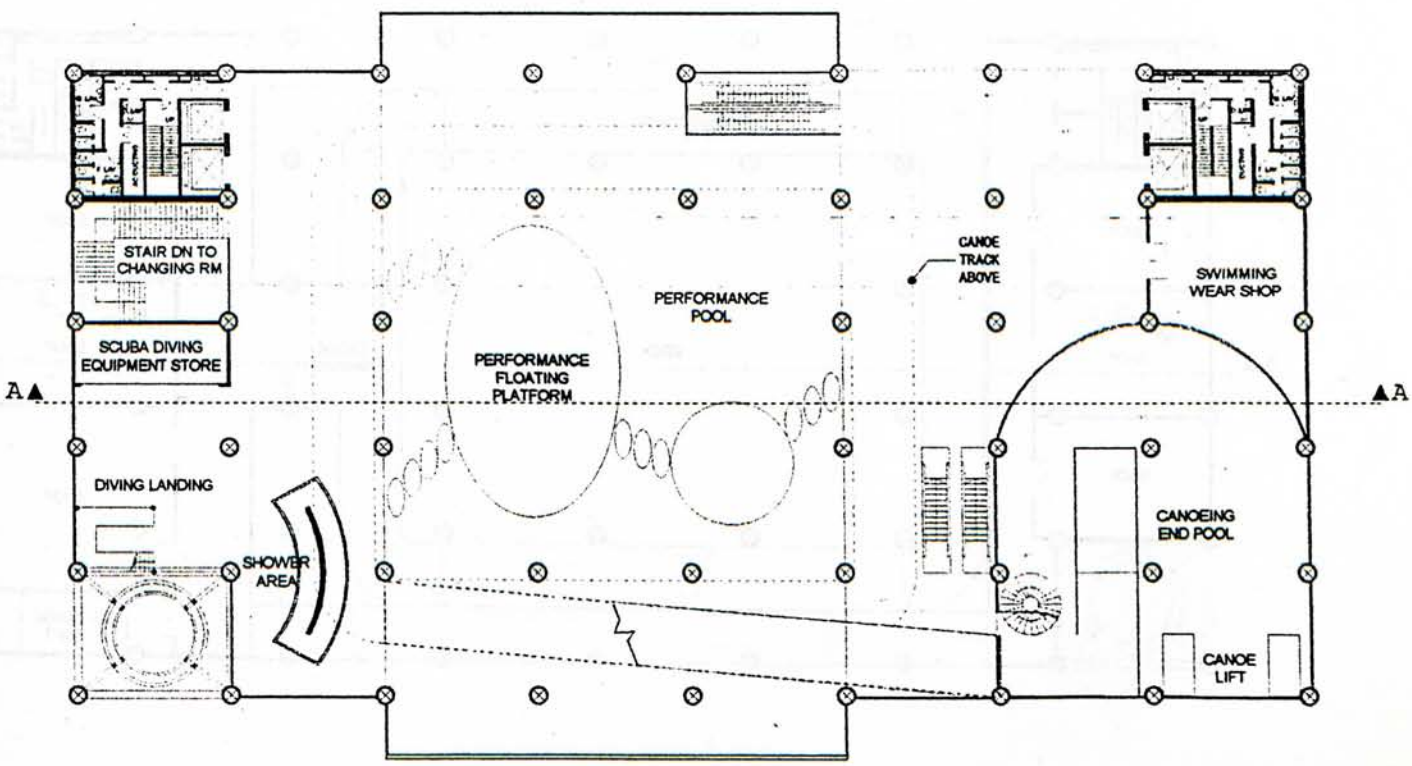
1. 1/F PLAN 1:500

9. Design Refine

Floor Plans



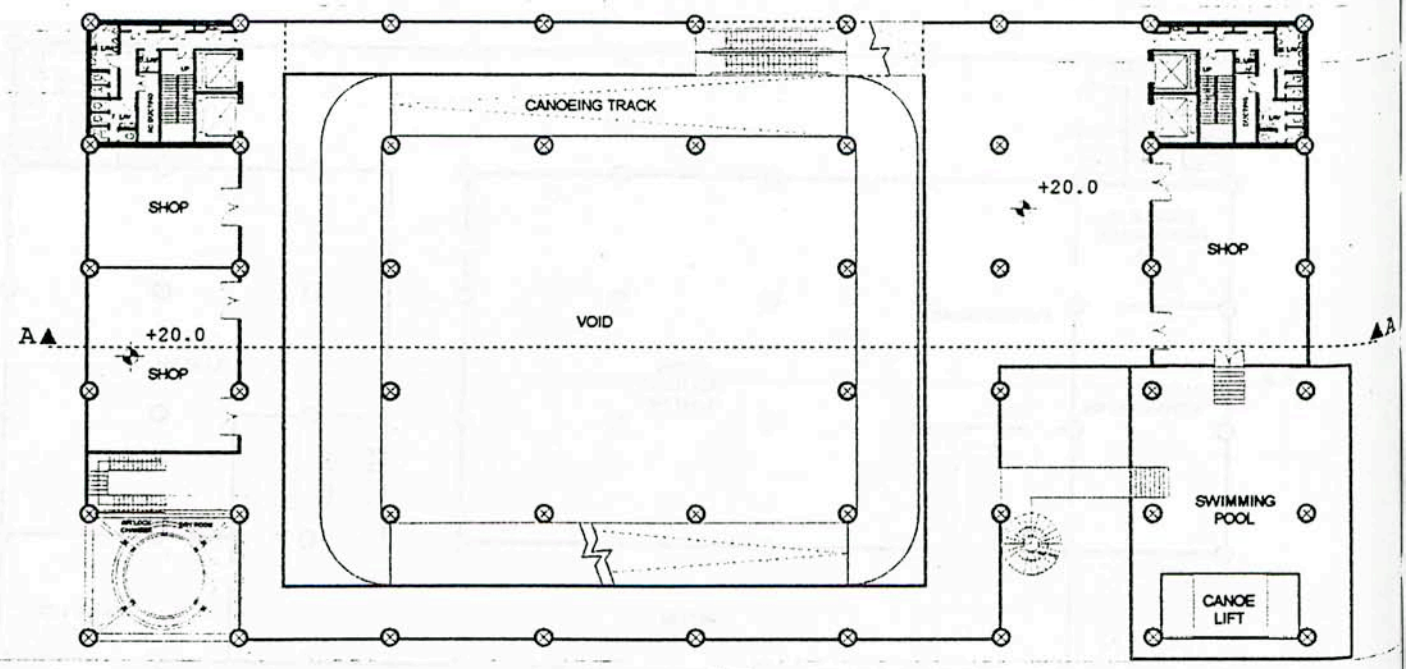
2. MECH. FLOOR PLAN 1:500



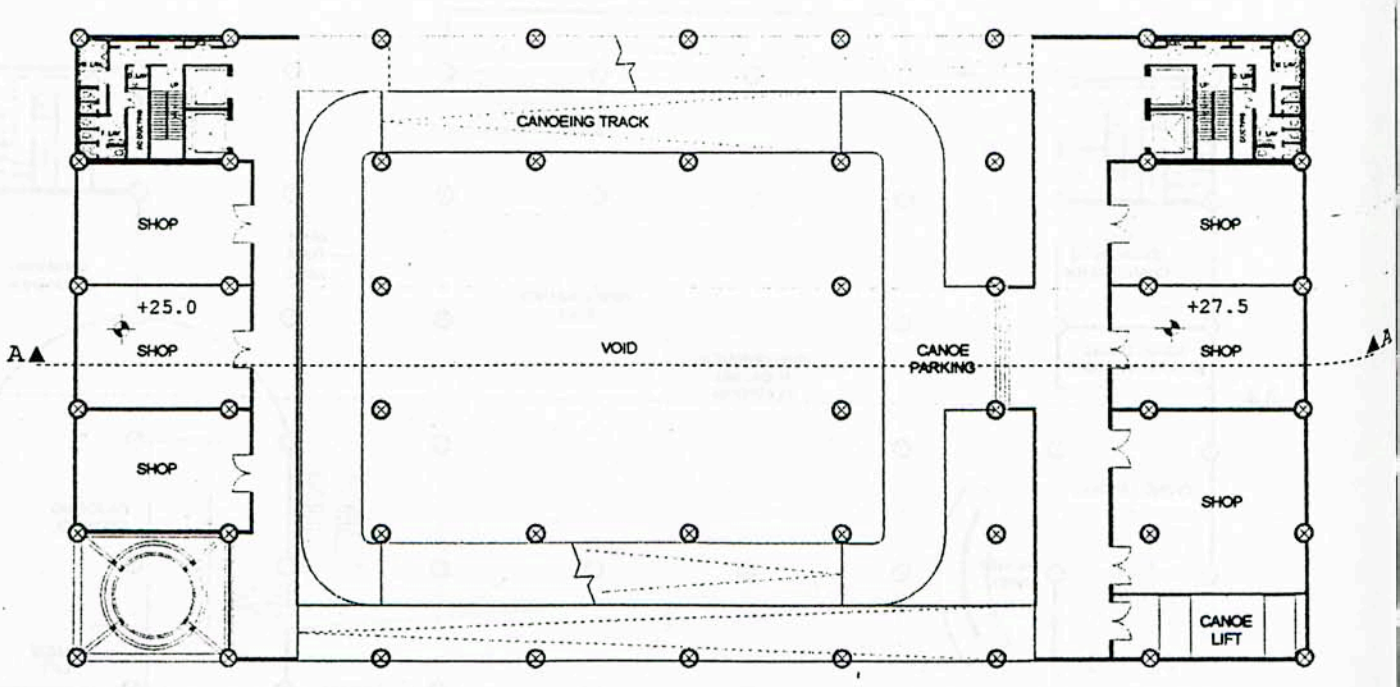
3. PERFORMANCE POOL PLAN 1:500

9. Design Refine

Floor Plans



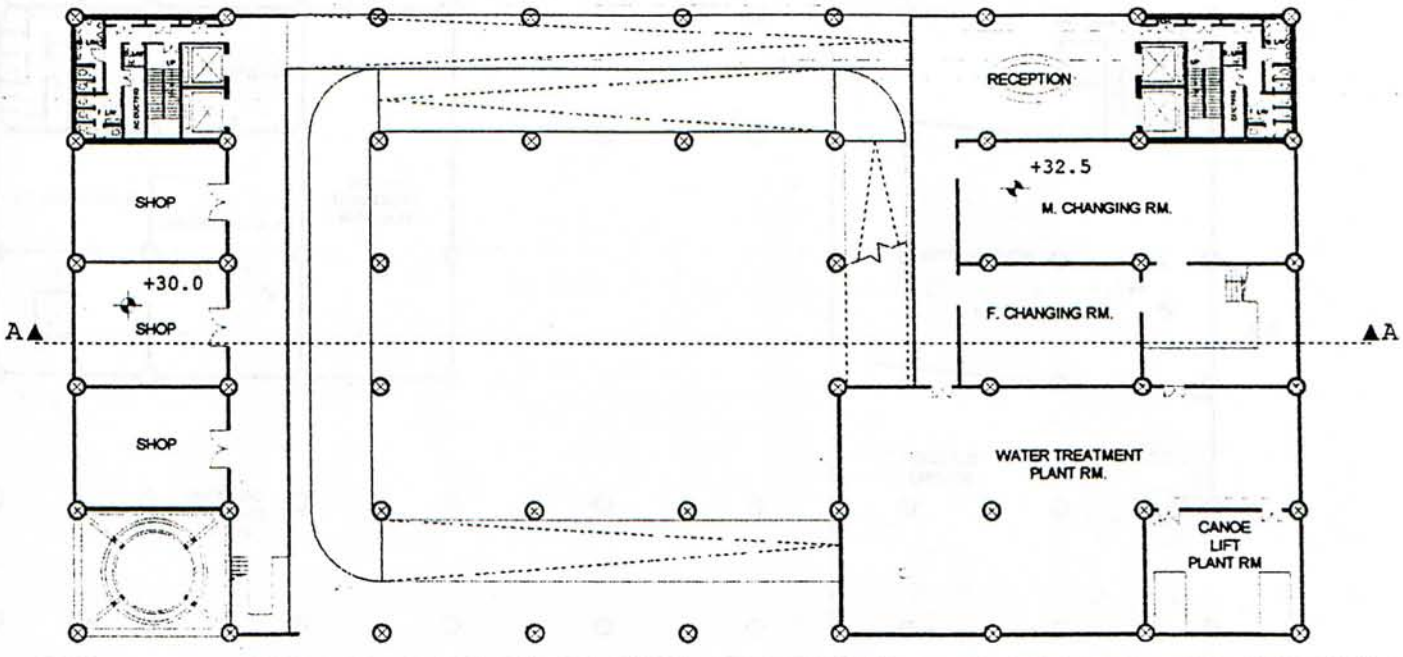
4. SHOPPING PLAN 1:500



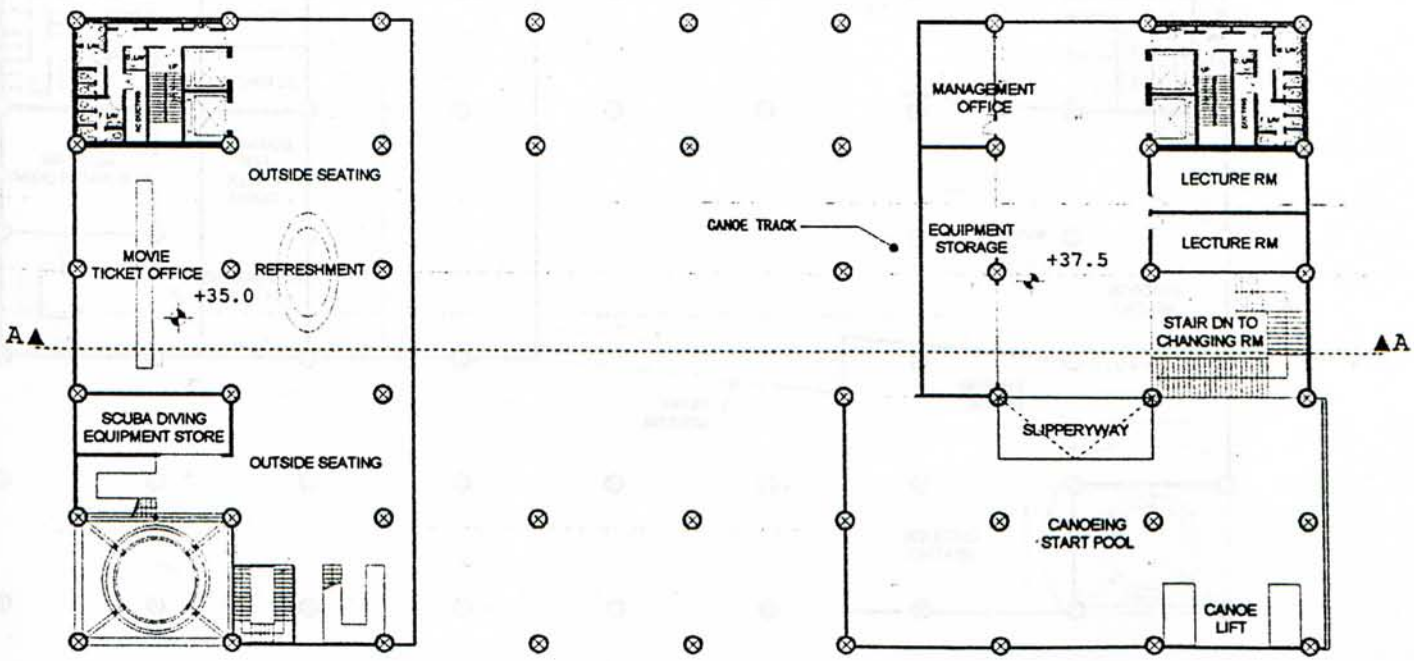
5. SHOPPING PLAN 1:500

9. Design Refine

Floor Plans



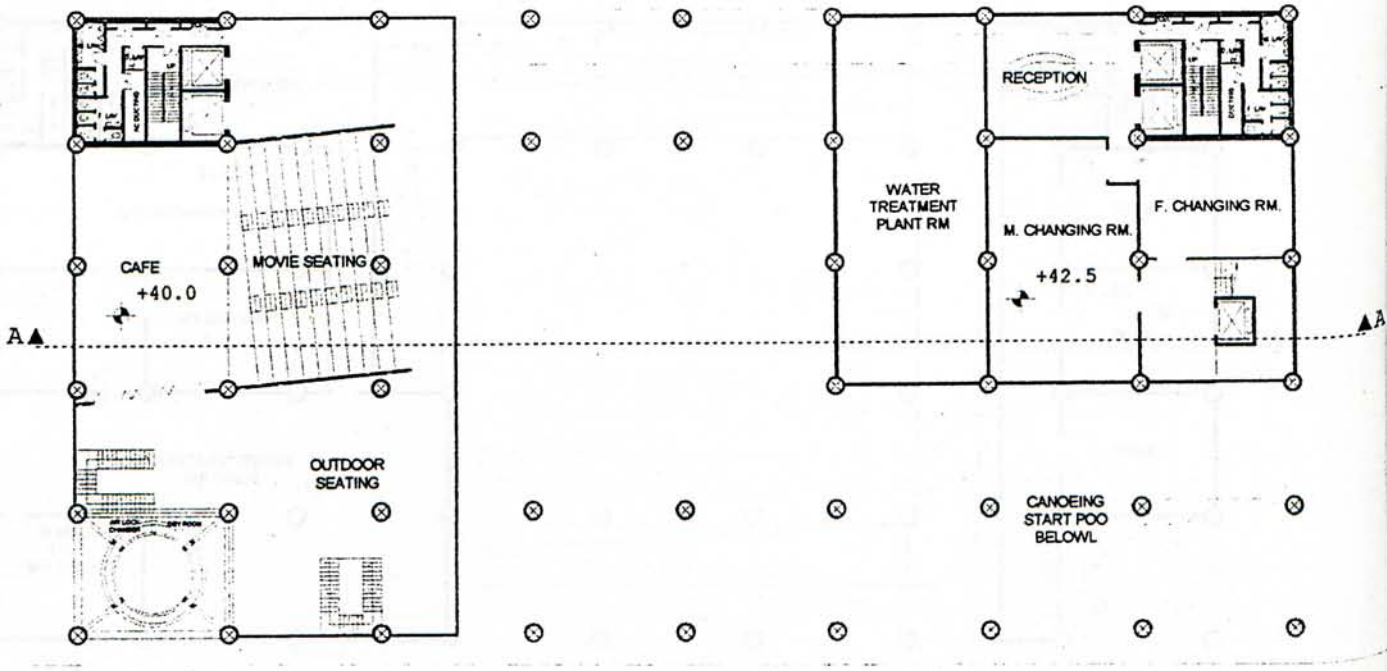
6. SHOPPING + MECH. PLAN 1:500



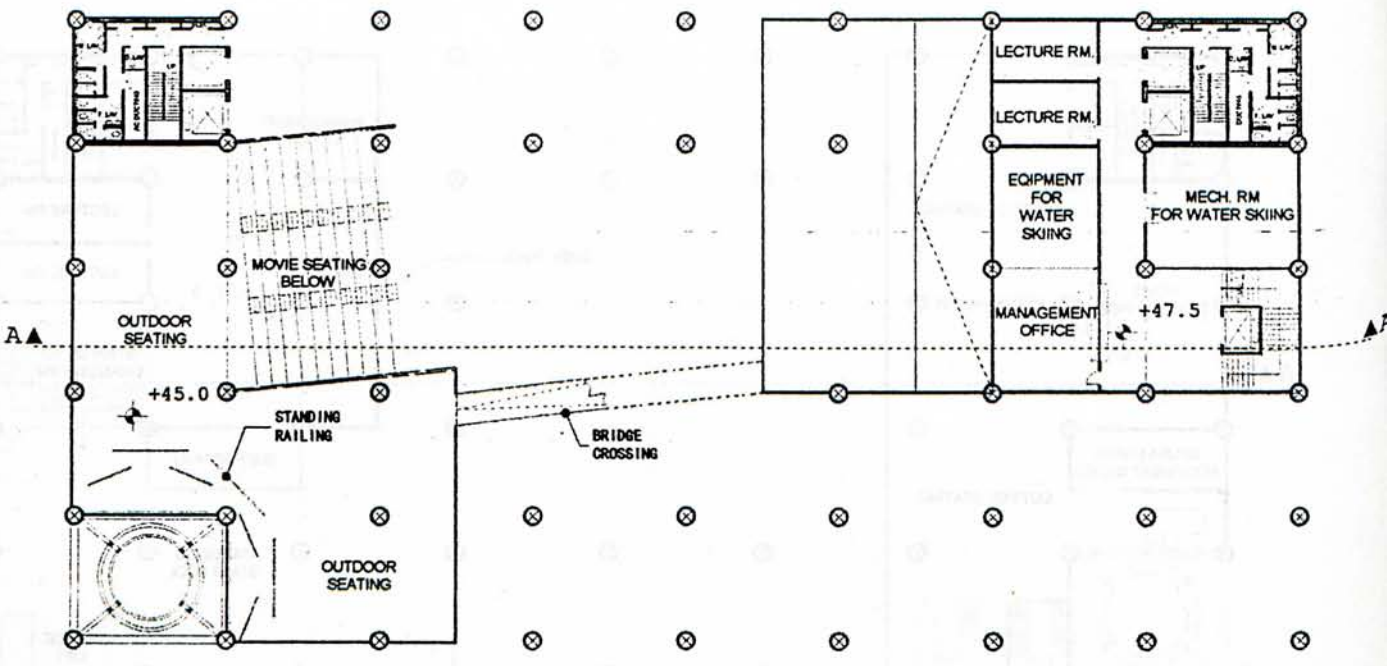
7. CANOEING START POOL PLAN 1:500

9. Design Refine

Floor Plans



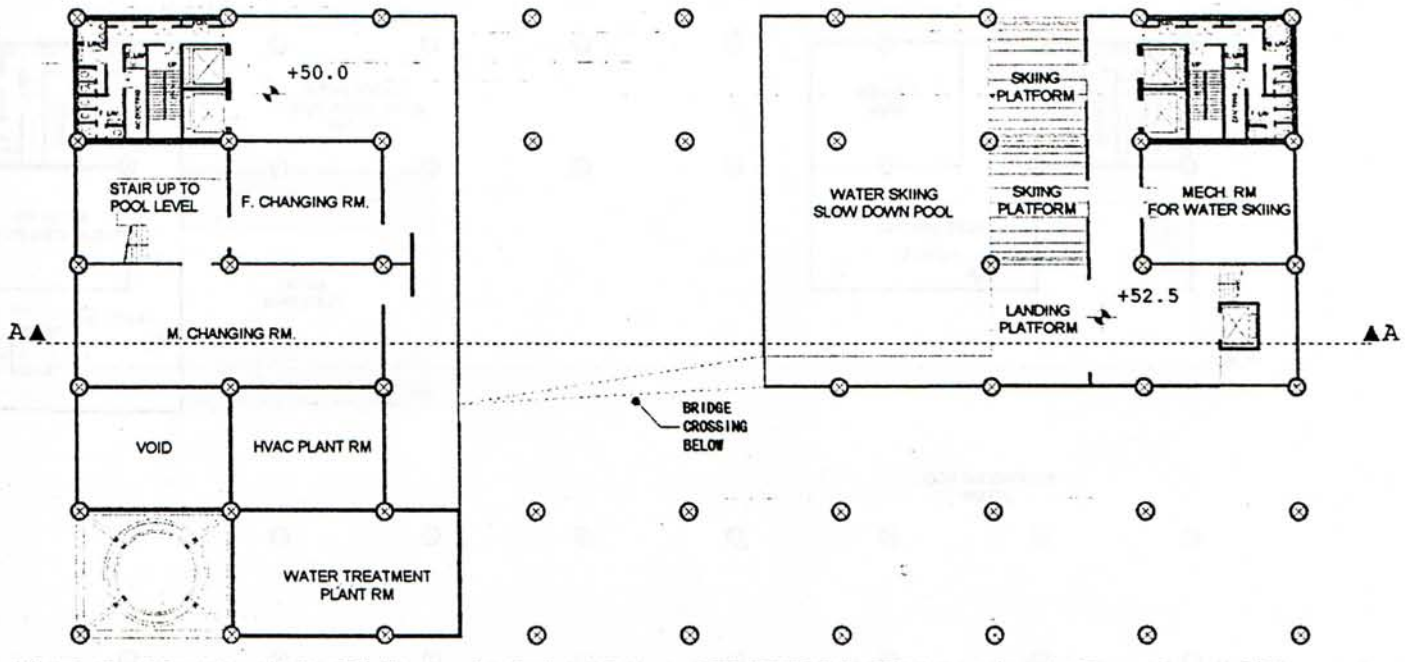
8. THEATRE PLAN 1:500



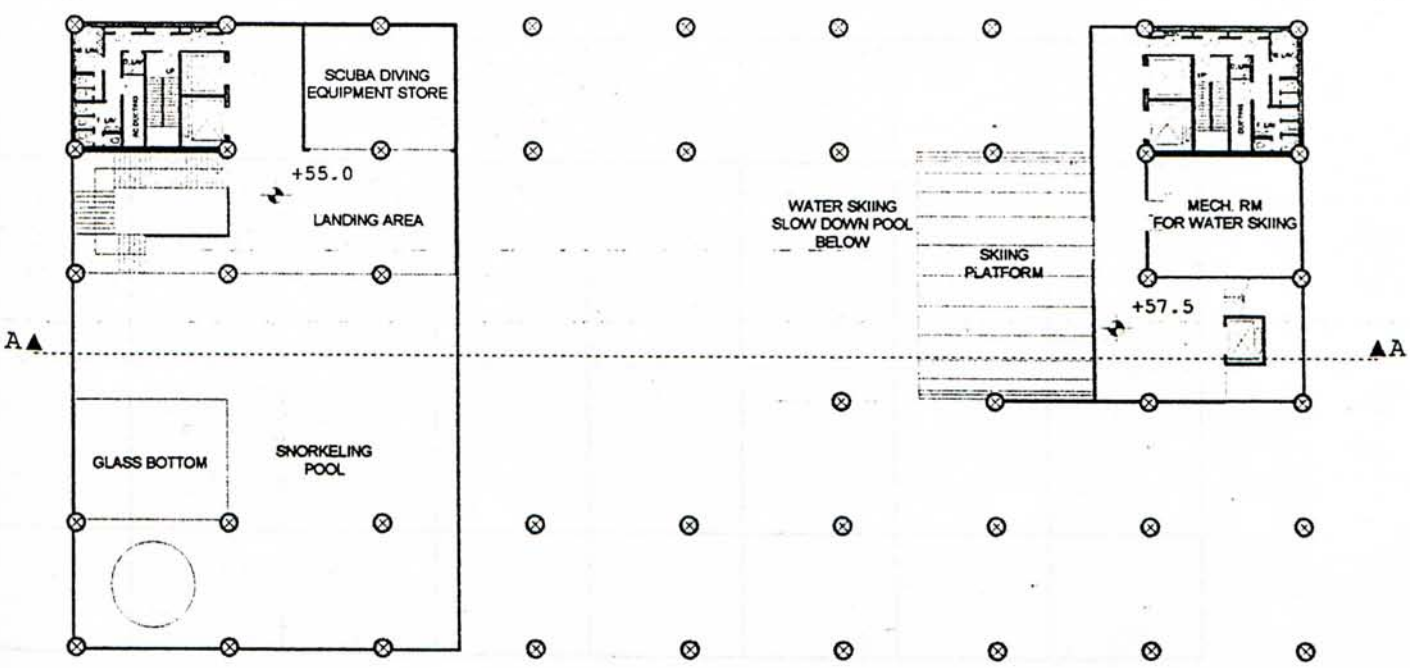
9. SKIING PLAN 1:500

9. Design Refine

Floor Plans



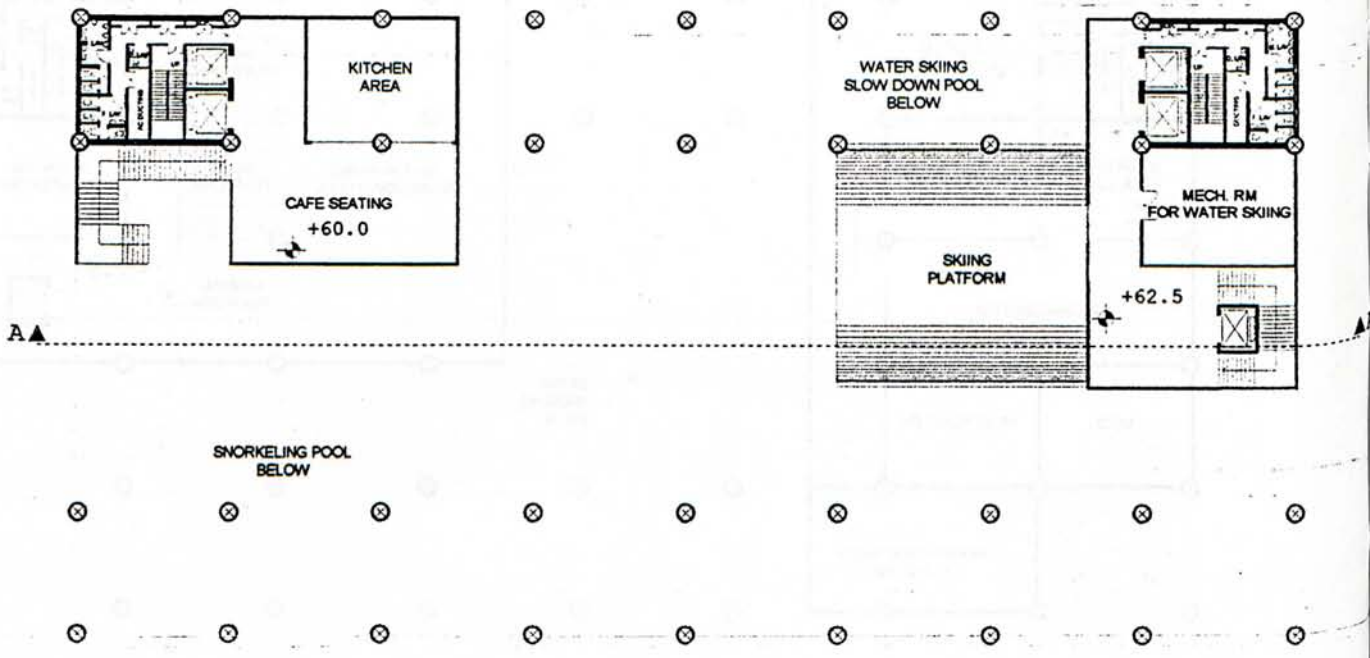
10. SKIING + MECH. PLAN 1:500



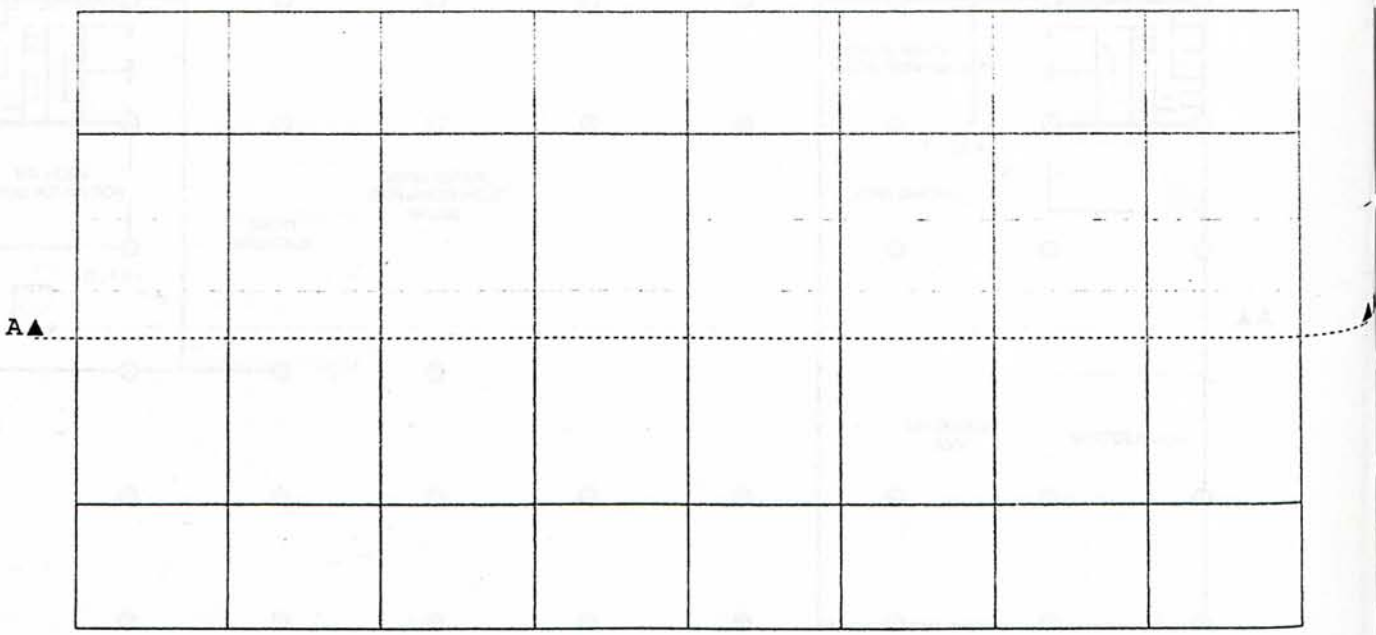
11. SNORKELING POOL PLAN 1:500

9. Design Refine

Floor Plans



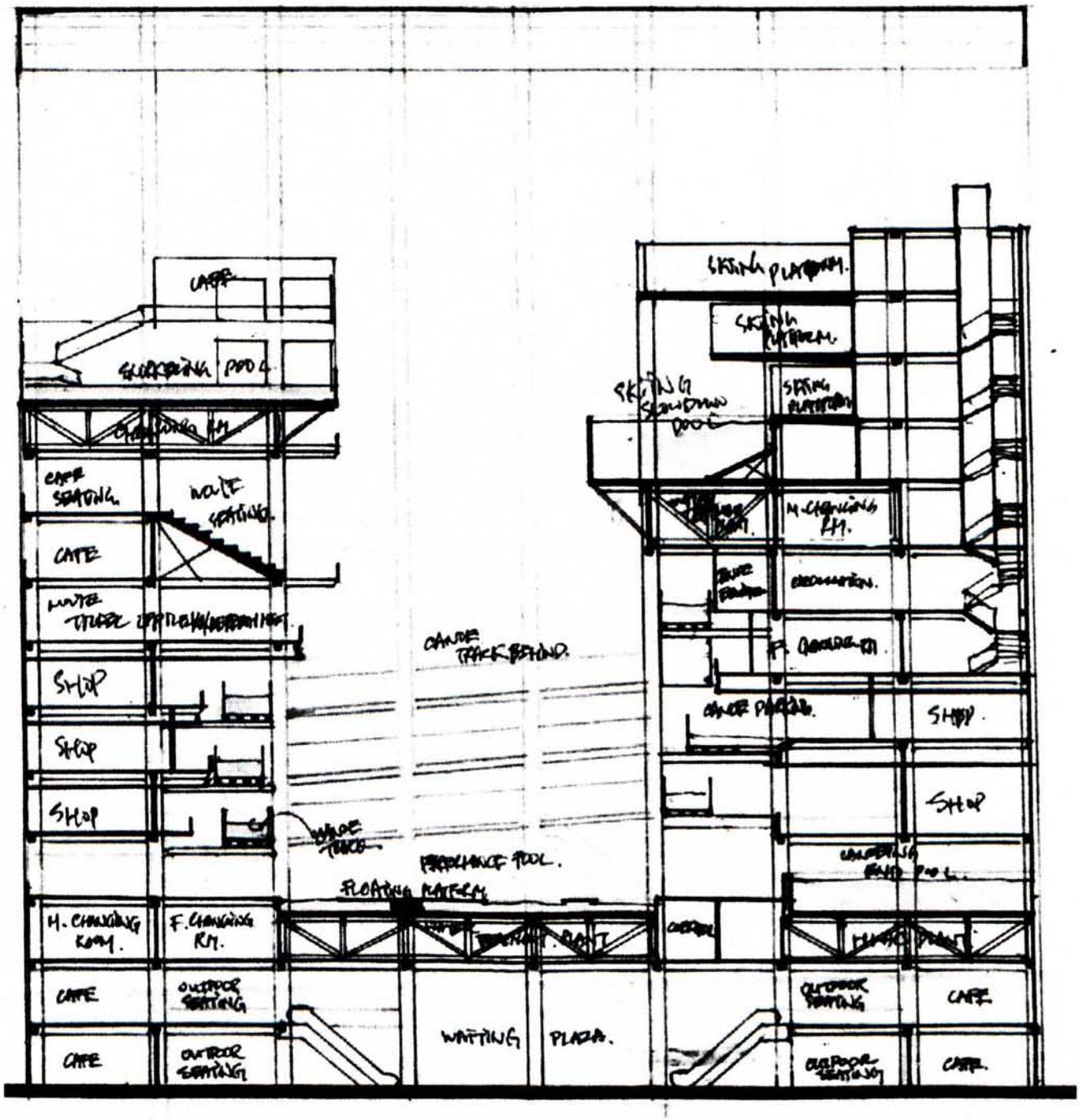
12. RESTAURANT PLAN 1:500



13. ROOF PLAN 1:500

9. Design Refine

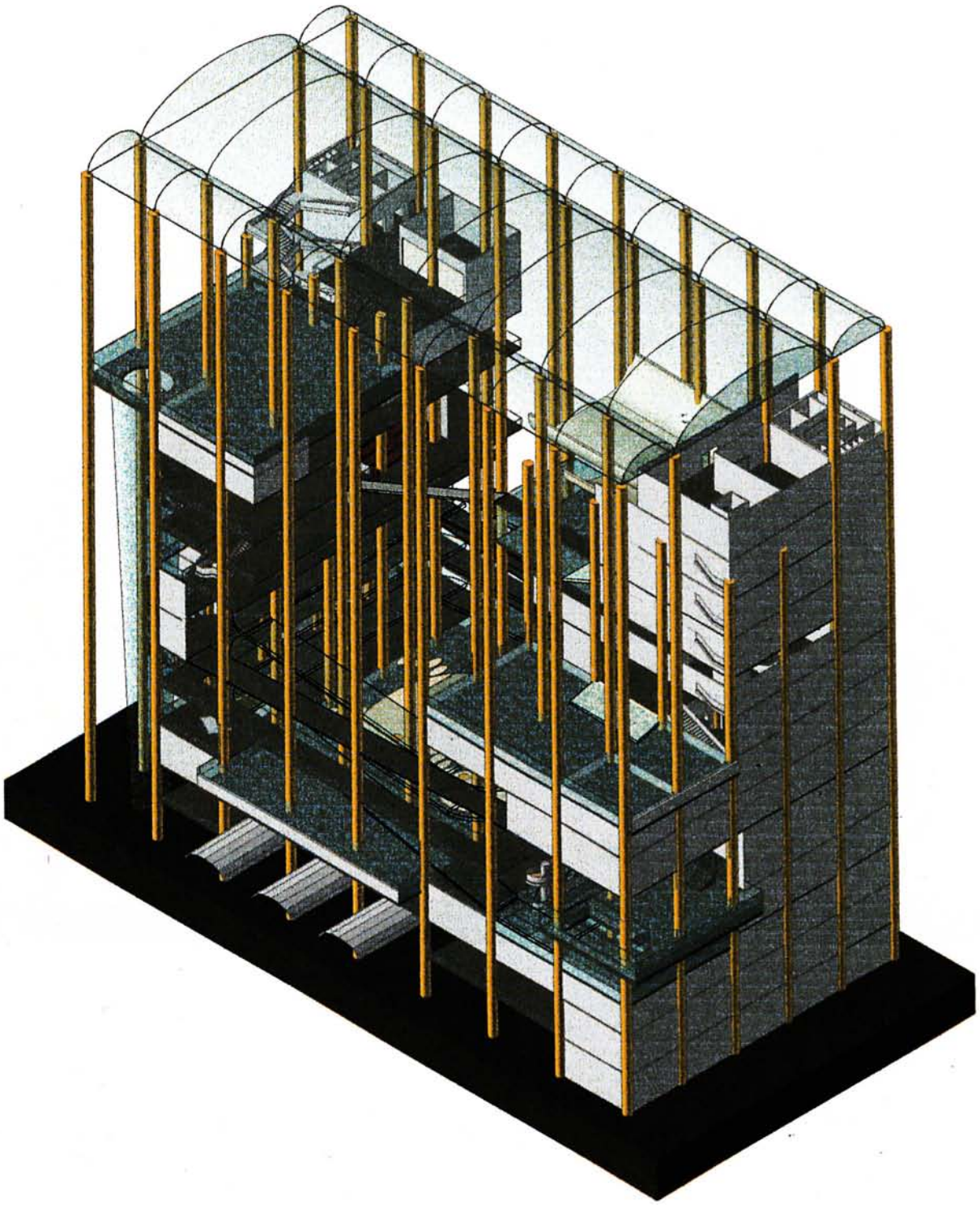
Section



SECTION AA 1:500

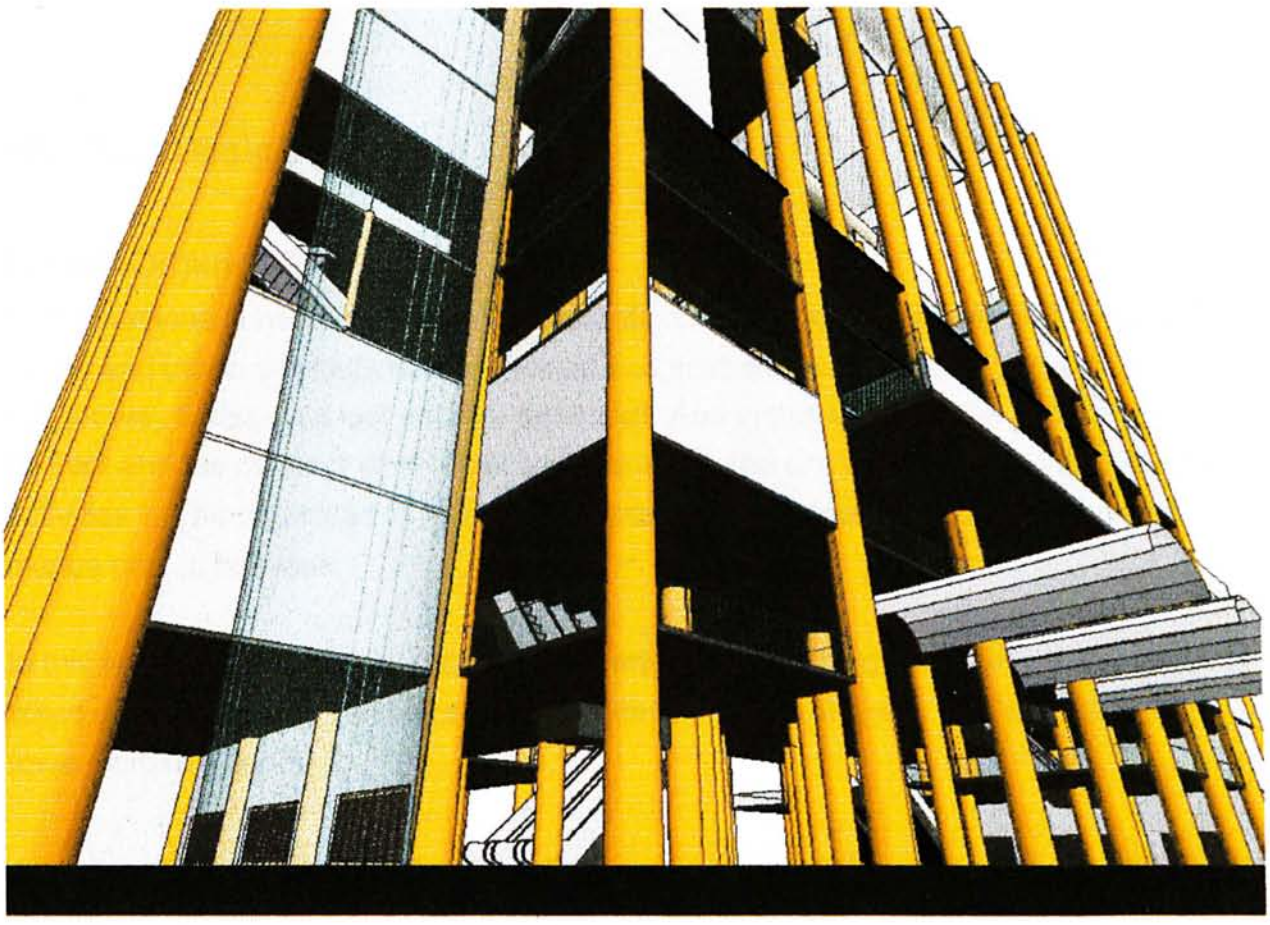
9. Design Refine

Isometric View



9. Design Refine

Perspective View



10. Final Design

Spatial Organization

In the previous scheme, the spatial organization is too complicated. As all the water sports and urban entertainment are mixed and scattered in the building, it is quite difficult for way finding and wet and dry treatment. And in this scheme, the general form will be kept and the concept of all water surface facing the sky without obstruction, but the activities will be organized to form a wet tower and a dry tower with a central performance pool in between.

In this scheme, the same kind of urban entertainment wil be grouped in a vertical way in stead of horizontal way in the previous scheme. E.g. the shops is now all in the dry tower across 4 floors.

10. Final Design
    Topic Refined

Programmatic Hybridity

Hybridity, as a genetic concept, can be traced back to Aristotle and his sophistic conjectures upon the origin of certain animal species as the result of crossbreeding. For a biological term, the offspring from crossbreeding will take the advantages from both sides of the parents.

There are lots of hybrid buildings in the city which are just putting different functions and programs under one roof. This should not be the end of the hybrid architecture. The concept of programmatic hybridity is introduced that the "offspring" will take the "gene" from both sides of the parents and mixing the programs to form a new program.

The programs chosen for this thesis are water sports and urban entertainment. Water sport is known as the activity that take up lot of space and the relied on the natural water resourse, it usually happens in remote coastal area. It seems to be impossible to play in the middle of the city.

To help water sports happen in the city, the way of playing it should be altered and mixed with other programs to make it popular and economical balanced. The urban entertainment like shopping, dining, live performance and movie are used to mixed.

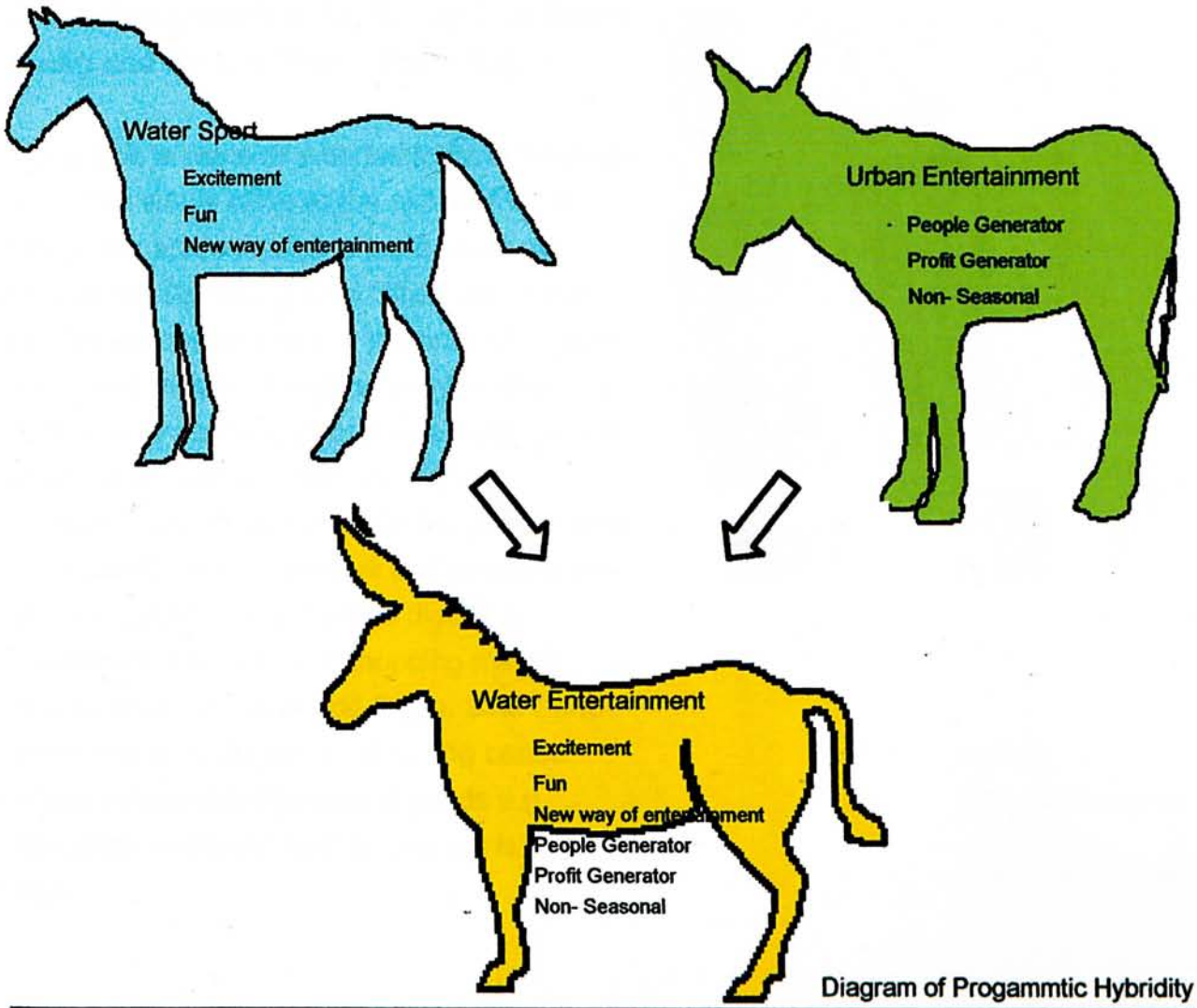


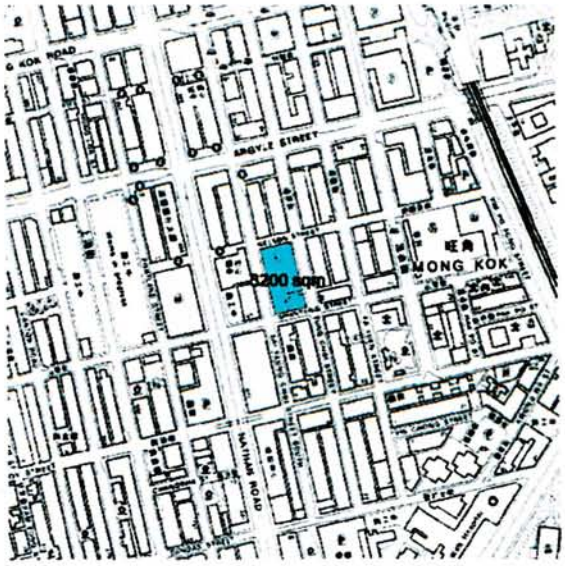
Diagram of Progammtic Hybridity

10. Final Design
    Site Selection

Site Selection

The selection of the testing site will be based on the criteria below

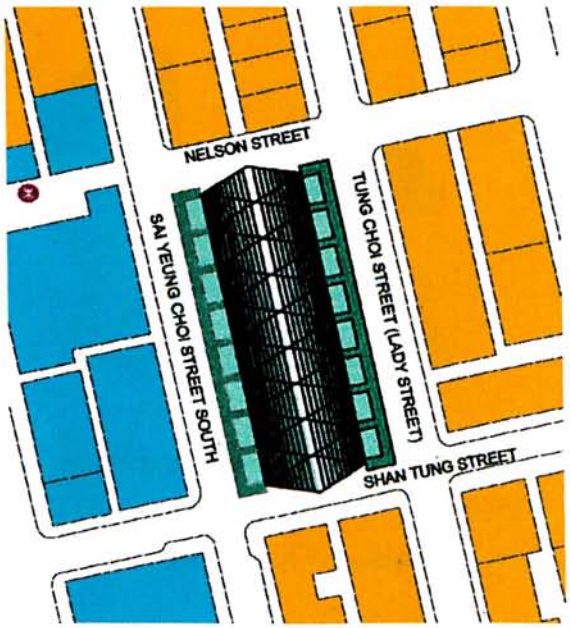
1. Easy access, near pubic transport like MTR to act as people generator
2. Have entertainment nearby close to the program proposed
3. Site area should be large enough to house the minimum requirement of the water sports



Location Plan

Old building block at Sai Yeung Choi Street South and Nelson Street, Mong Kok

Mong Kok is place of entertainment in Kowloon side. The site is close to the exit E of MTR Mong Kok station which is the busiest exit. Part of the Sai Yeung Choi Street South will become pedestrian way at the time after working hr and also for Saturday and Sunday afternoon. And Tung Choi street (Lady Street) is also a pedestrian walkway. For the surroundings, along Nathan Road are commercial building over 20 storeys and beside some shopping mall, the rest of the district is residential. There lots of shopping malls around such as Hollywood Plaza, Sino Shopping Centre. And there is shopping centre which selling one one type of goods e.g. MongKok computer centre. Site are is 3200 sqm.



Site Plan

LEGEND

COMMERCIAL BUILDING

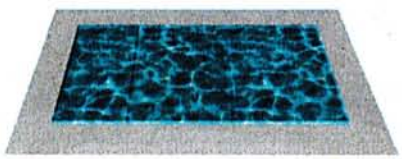
RESIDENTIAL BUILDING

10. Final Design
    Spatial Organization

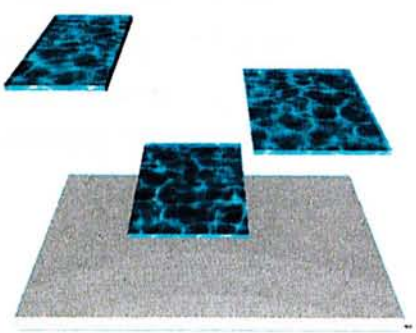
Spatial Organization

1. All water surfaces are open to the air. The water surface area equal to the plot area.

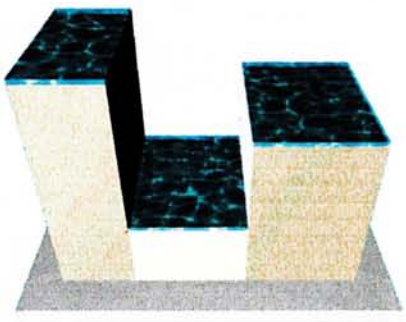
2. Water surface breaks down into several segments



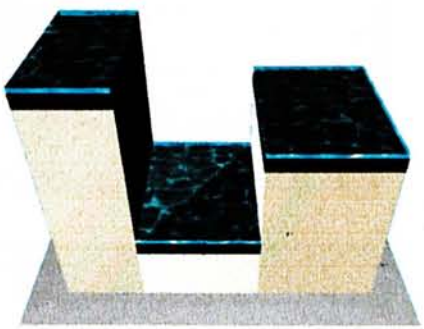
3. Different water surfaces are set to different levels.



4. The volume below the water surface are used for the urban entertainment to provide edge for "hybrid".



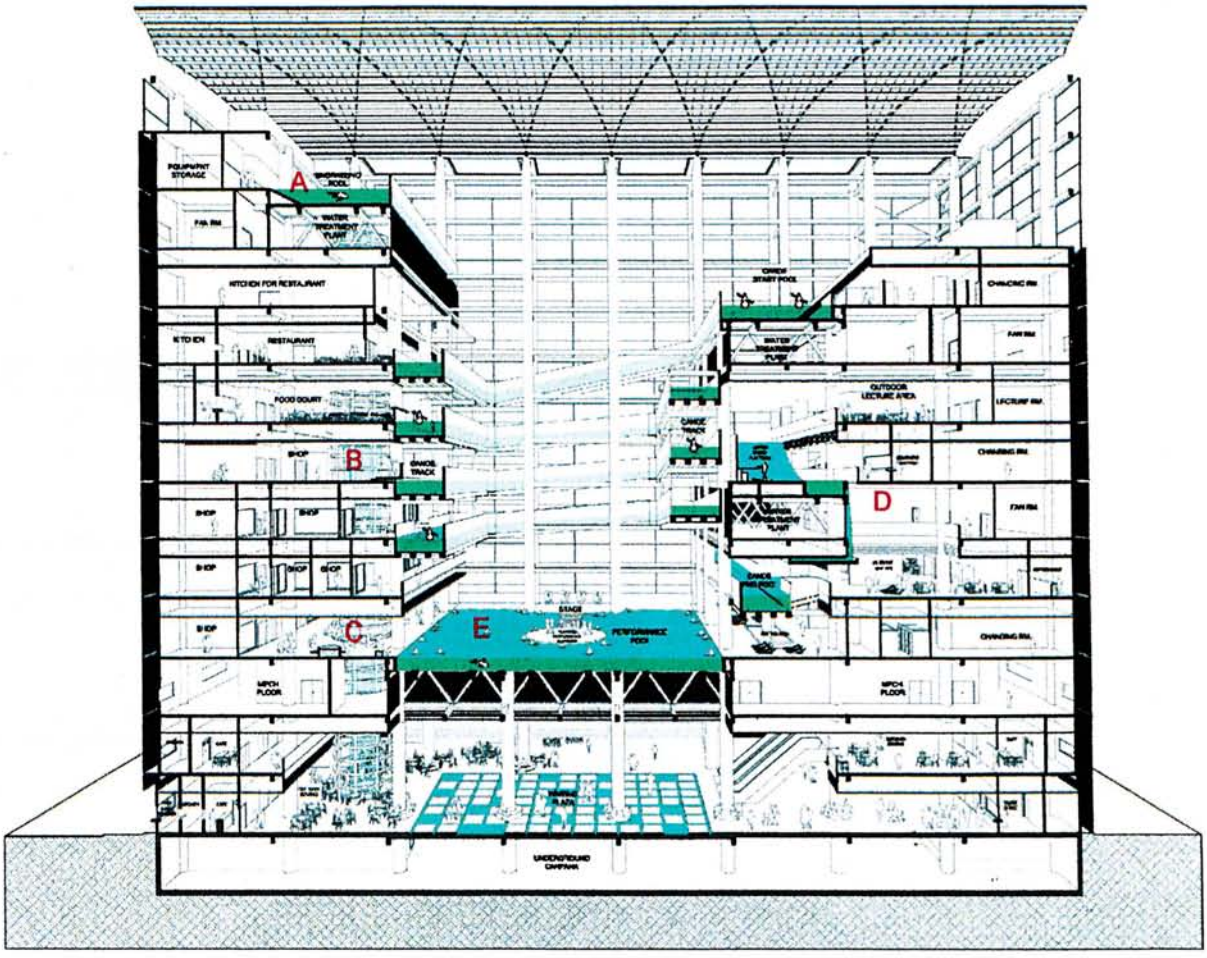
5. Trusses are employed to support the weight of the water. Space of truss wil be used for mechanical.



6. Two sides of the building will be divided into "wet" and "dry" towers for easy treatment of water.

10. Final Design

Combination Scheme



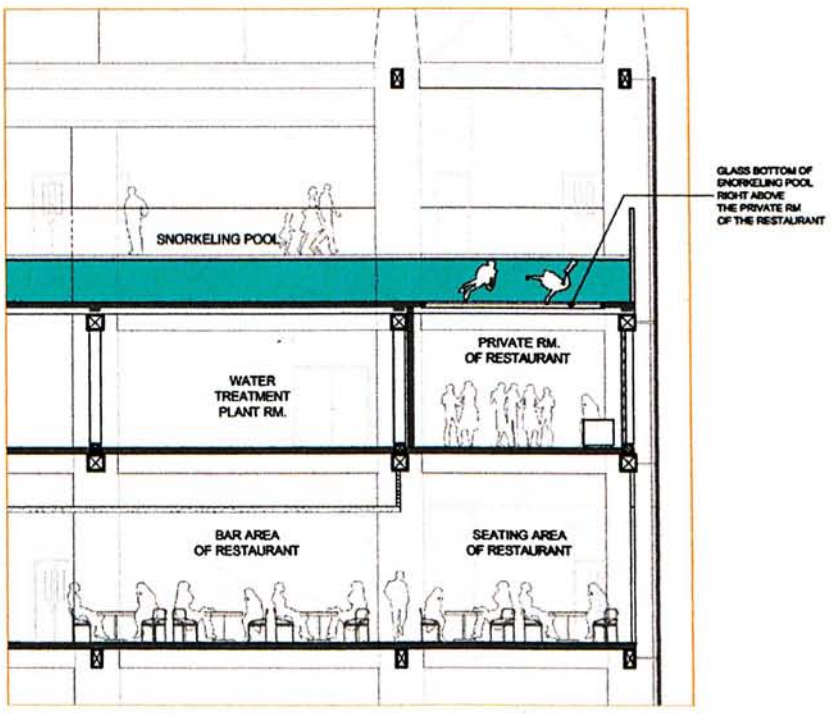
Sectional Perspective

A. Snorkeling + Dining
B. Canoeing + Shopping
C. Scuba Diving + Others
D. Skiing + Movie
E. Swimming + Live Performance

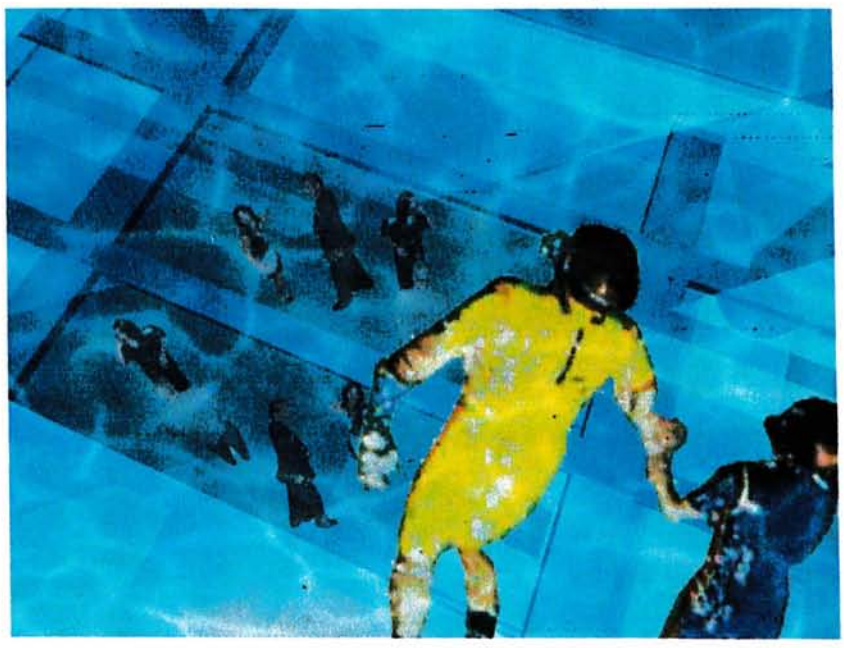
10. Final Design
    Combination Scheme

A. Snorkeling + Dining

The snorkeling pool is situated at the top floor of the "dry" tower. The snorkeling players can have eye contact with the once in the private party room through the glass bottom of the pool.



Partial Section



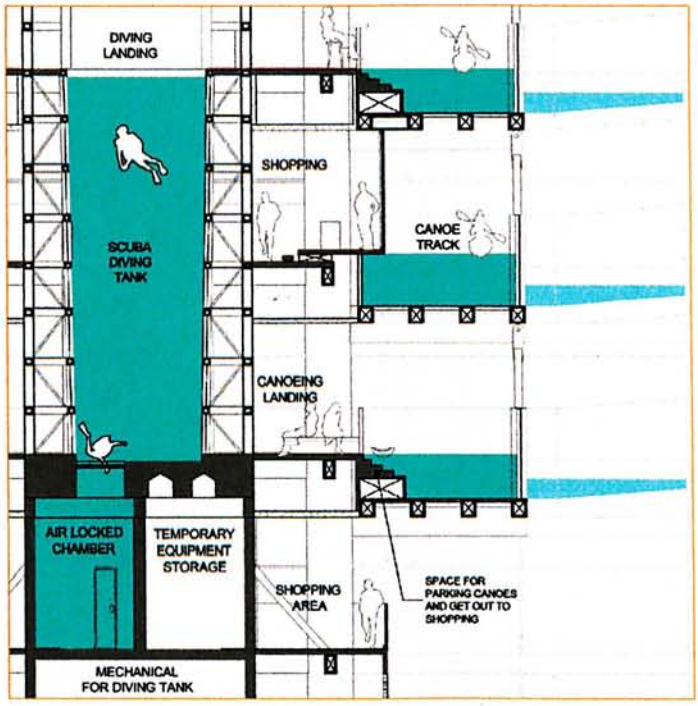
Perspective View above the Snorkeling Pool

10. Final Design

Combination Scheme

B. Canoeing + Shopping

The canoes are running downwards from the start pool which is situated on the top floor of the " wet" tower along the canoe track. At certain point along the canoe track, the canoe players can park their canoes and access the shops. The canoes will be finally transported to the start pool by canoe lift.



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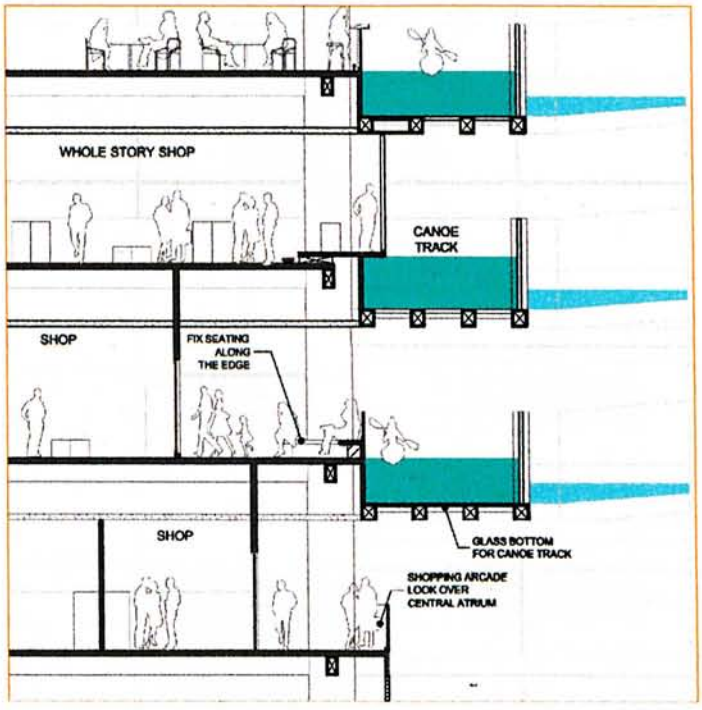

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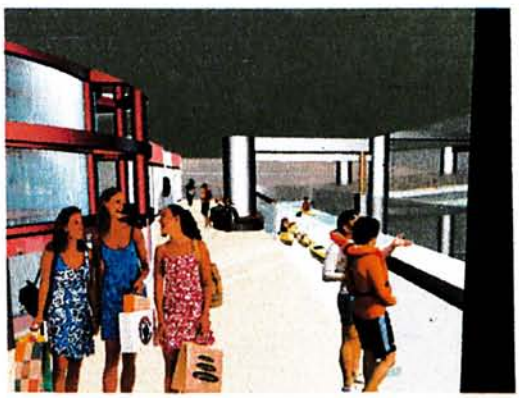


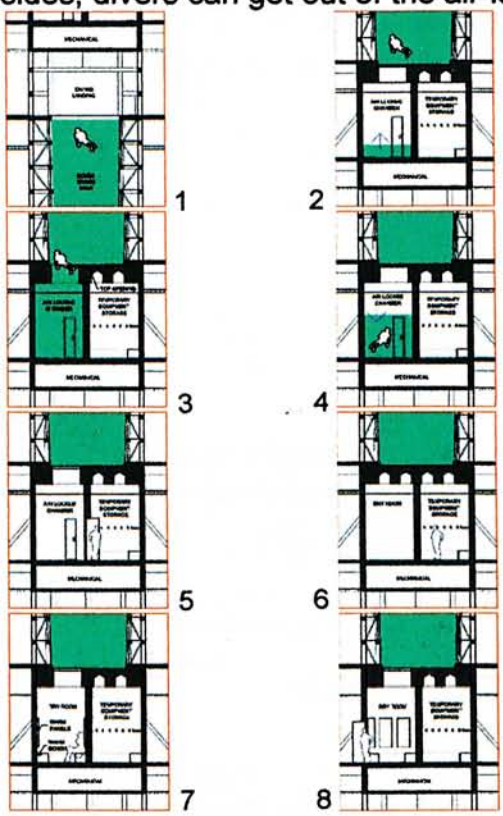
Perspective view in shopping arcade with canoe parking

10. Final Design

Combination Scheme

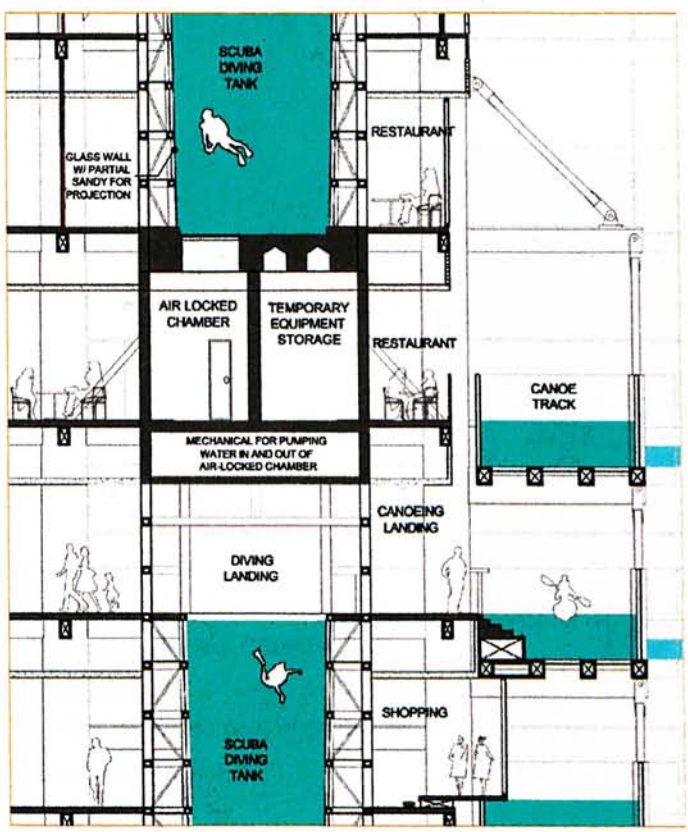
C. Scuba Diving + Others

The transparent diving tank is situated in the middle of the "dry" tower from snorkeling pool down to carpark. By air-locked chamber, there are lots of interaction with other "dry" person, e.g. movie projected on the glass of the diving tank can be viewed by both sides, divers can get out of the air-lock chamber to food court to have a coffee.



Working Sequeue of Air-lock Chamber

Perspective View into the scuba diving tank to have vedio appreciation from both sides

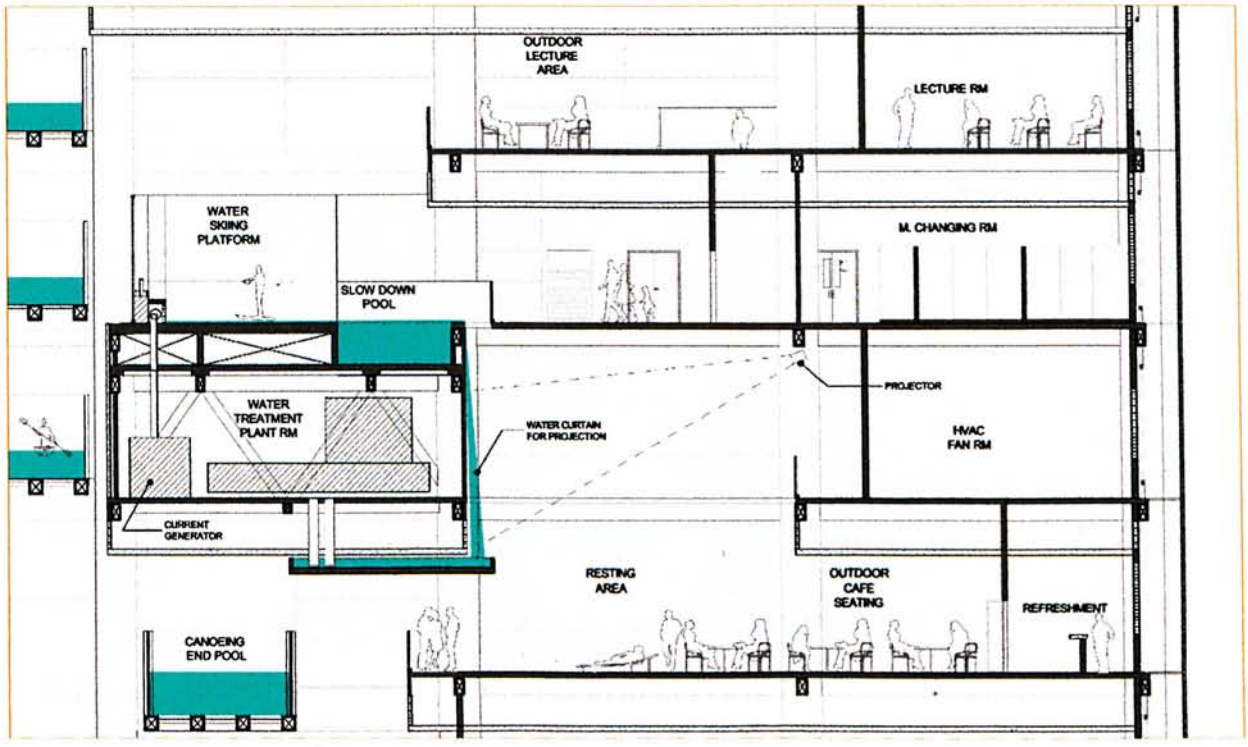


Partial Section

10. Final Design
    Combination Scheme

D. Water Skiing + Movie

A special device is introduced for indoor skiing. A half tube like platform with high speed water current generator to make a fast and thin layer of water along the tube. The player is stayed still in position. And there is slow down pool for accidental lost of grasping. The excessive water from slow down pool will come down through the void to form a water curtain for projection in the café seating area below.



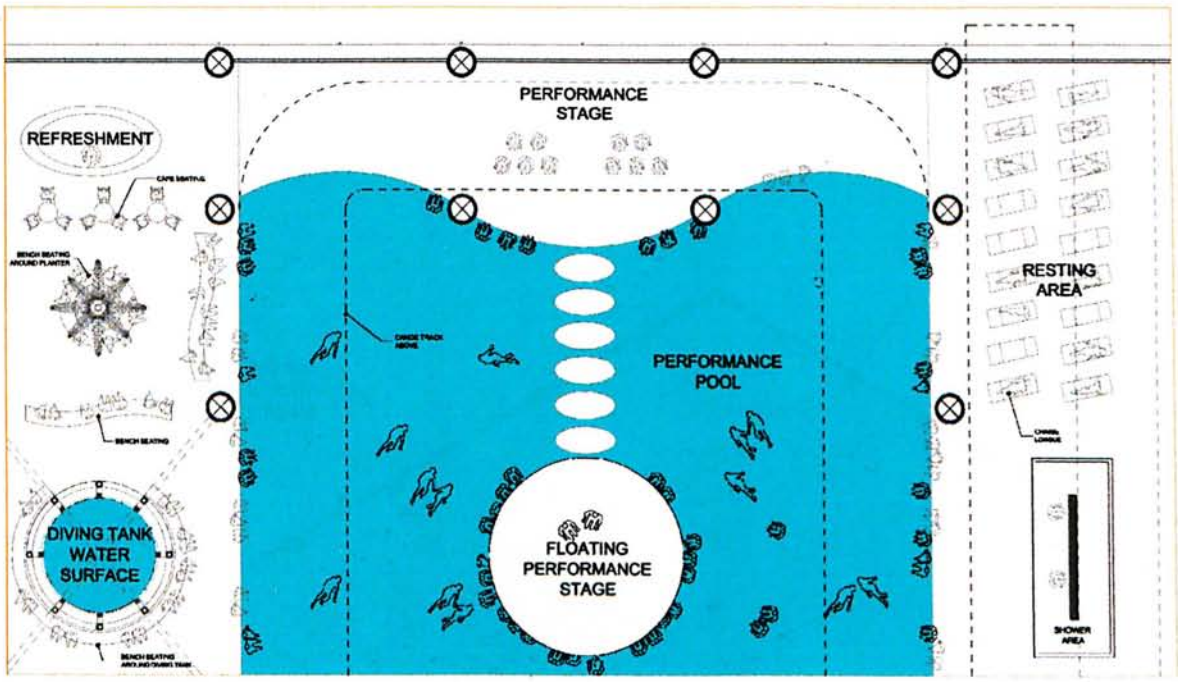
Partial Section

Perspective view from the cafe area looking up to the projection on the awter curtain created by the skiing platform.

10. Final Design
    Combination Scheme

E. Swimming + Live Performance

Central performance pool is situated at the bottom of central atrium which gives view from space surrounded. Performance can be the stage and the platform and the viewers will be in the water to watch the performance. And also it can be vice versa.



Partial Plan

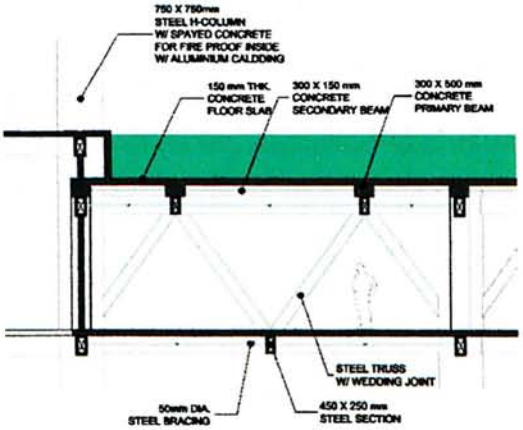
Perspective view from performance pool towards the stage

10. Final Design

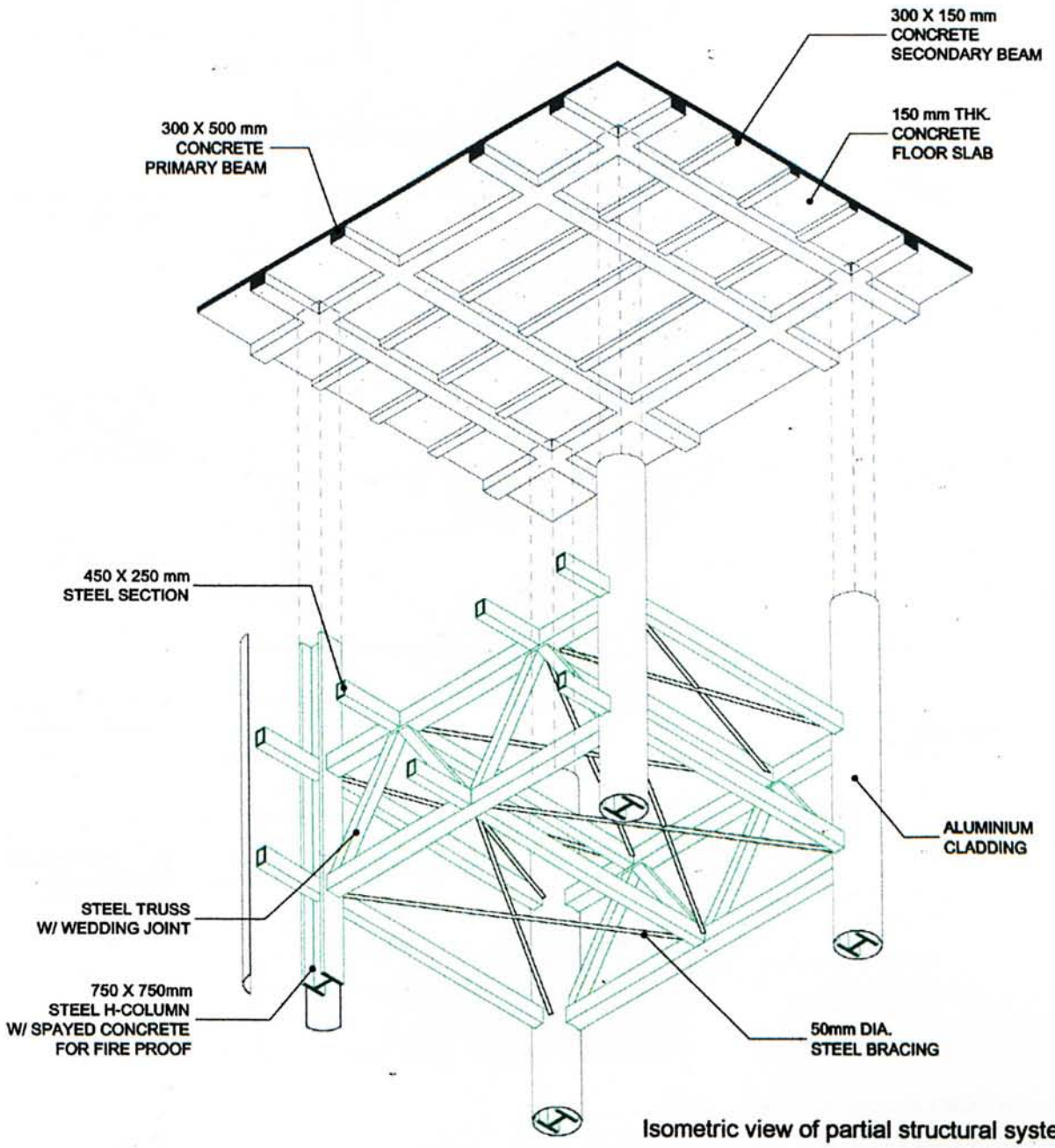
Special Study

A. Structure

In order to support the large loading of water (about 10 kpa). Truss system is employed. And in order to use the space in truss, water treatment plant room will be put.



Partial Section

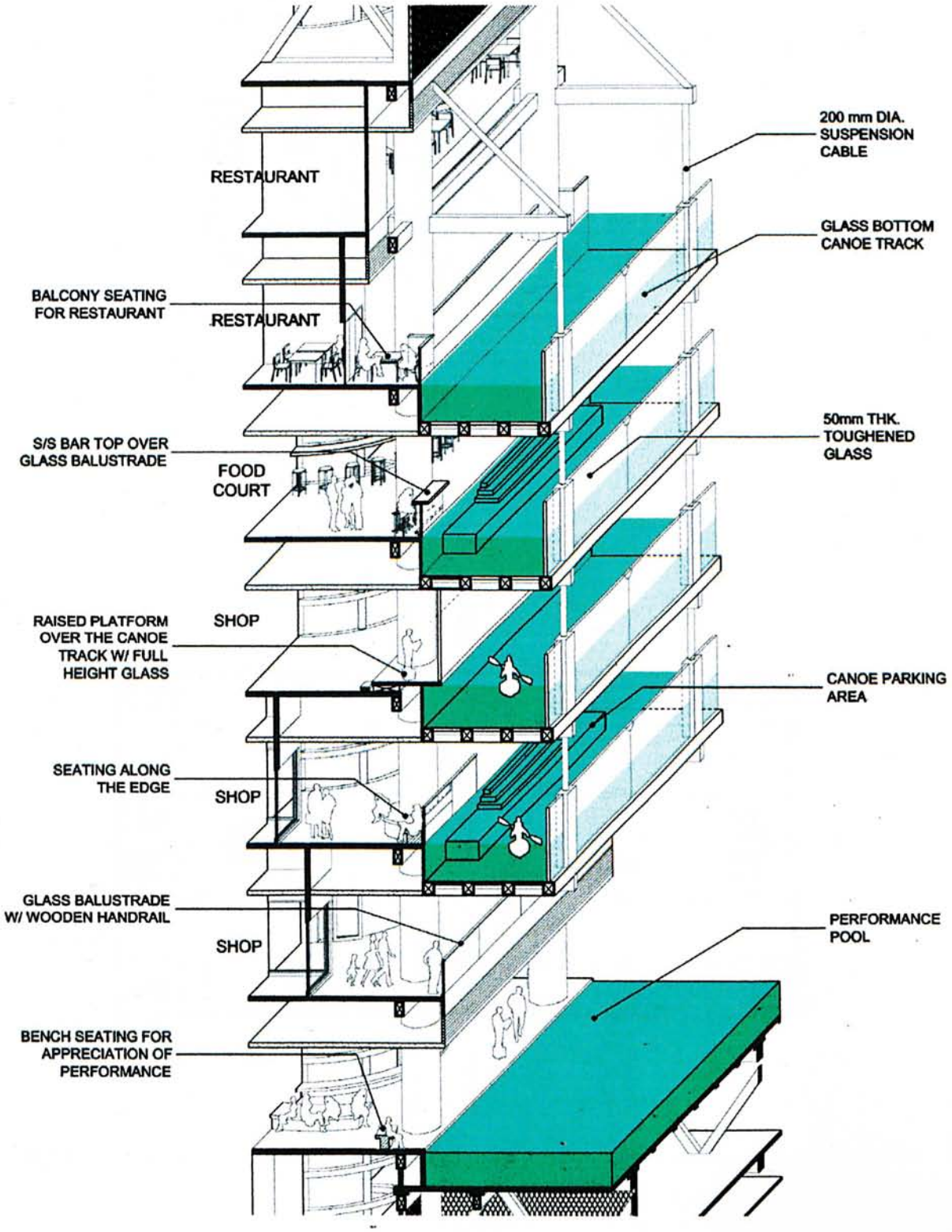


Isometric view of partial structural system

10. Final Design
    Special Study

B. Edge Treatment

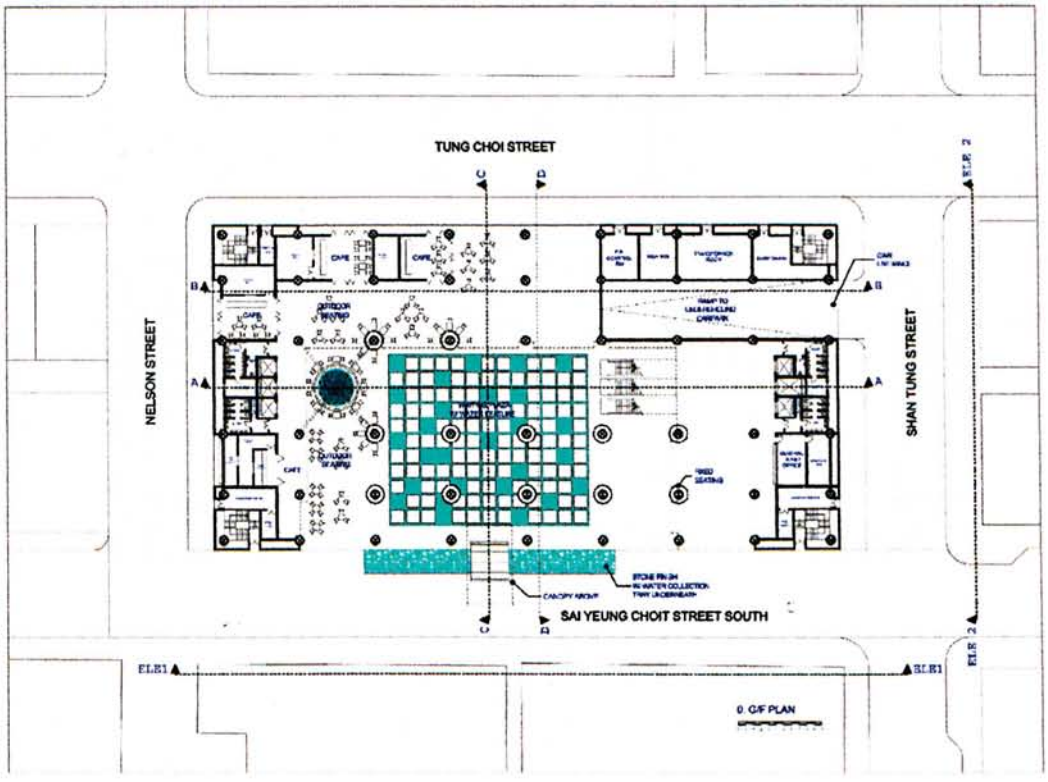
The edge between the "water" part and "non water" part is important for this thesis. For this scheme, take the edge of canoeing with the shopping and dining illutration to show how to enhance the interaction.



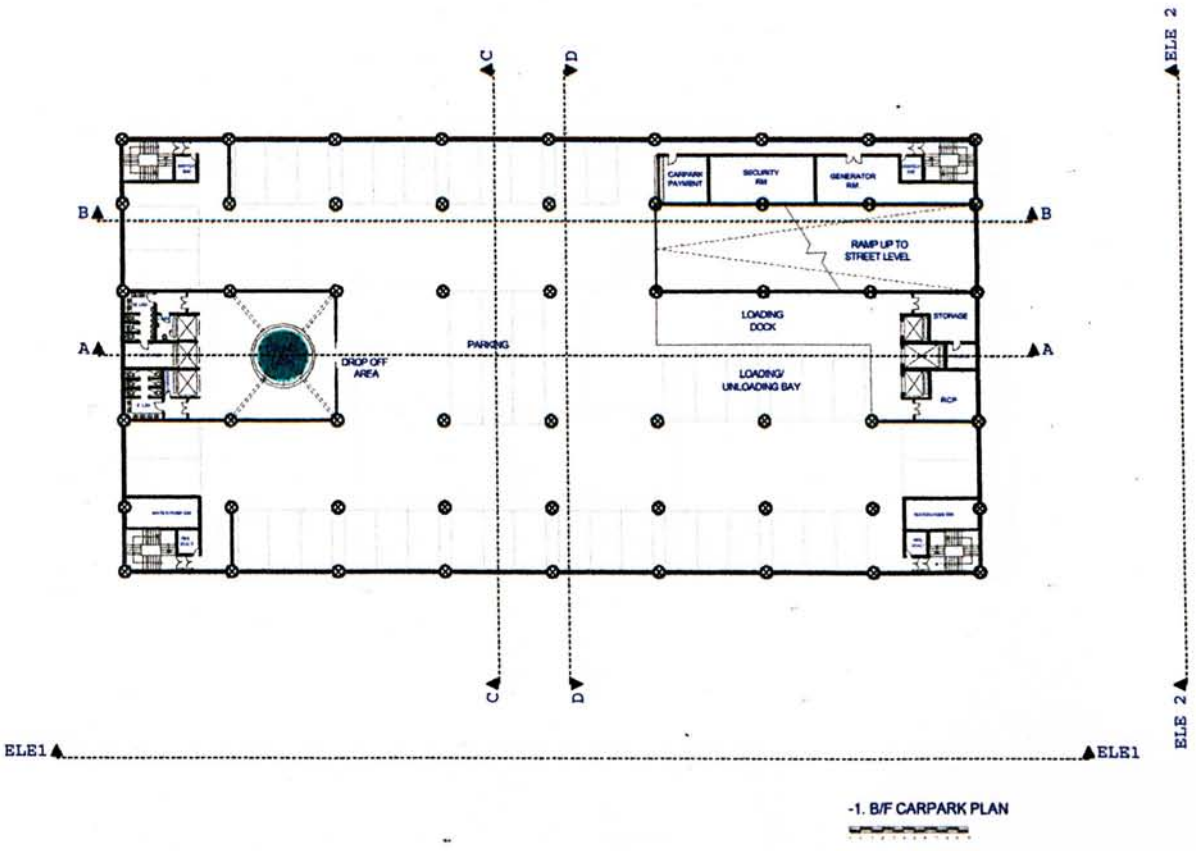
Isometric view of edge between canoeing and shopping and dining

10. Final Design

Floor Plans



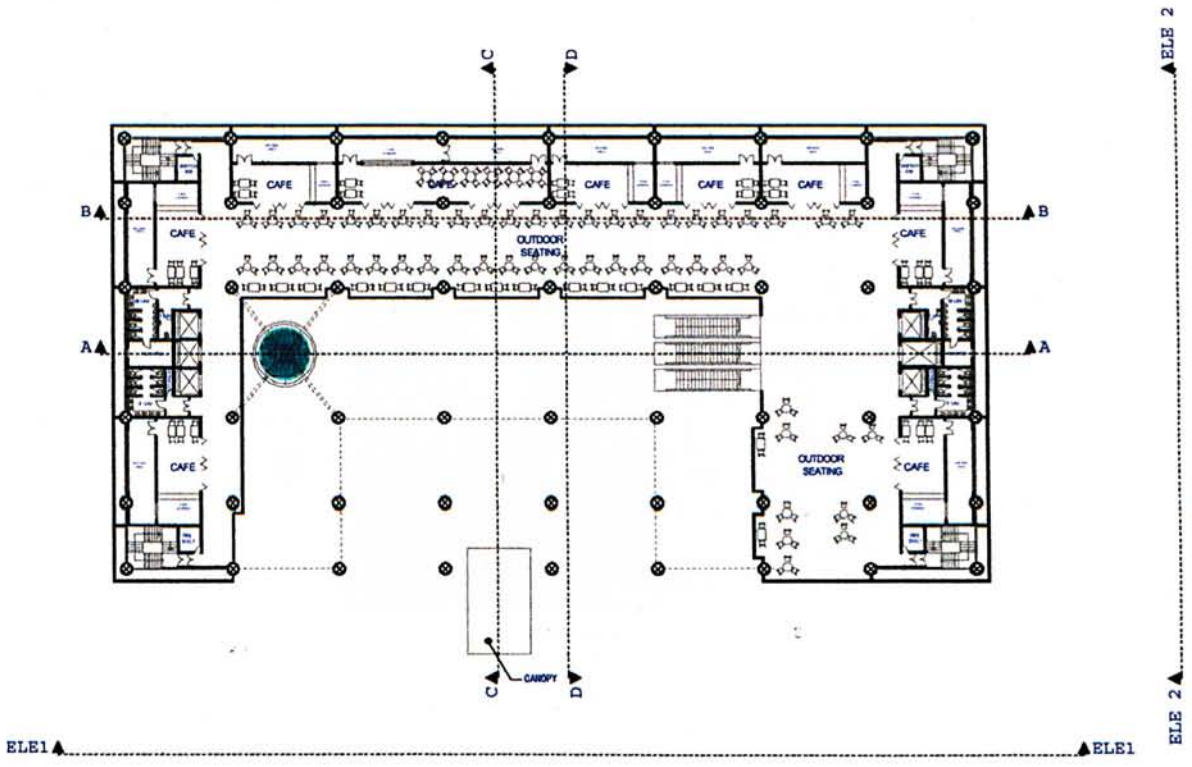
G/F PLAN



B/F PLAN

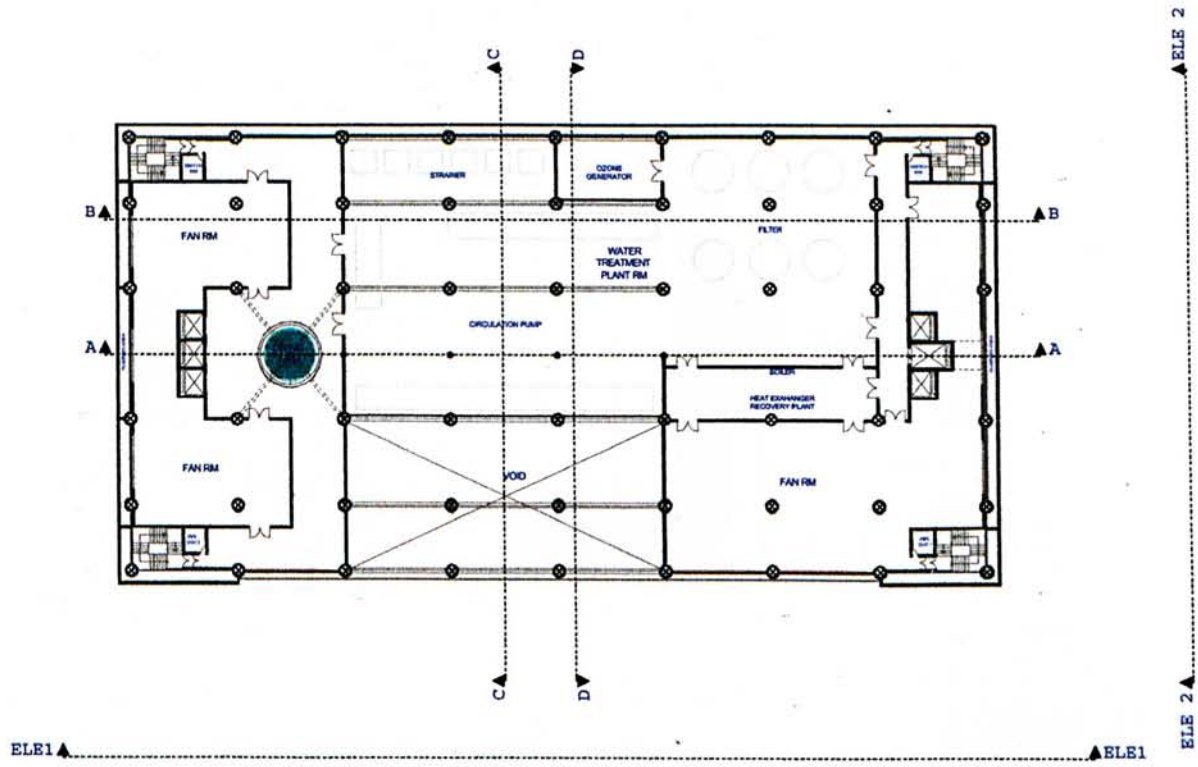
10. Final Design

Floor Plans



1. 1/F PLAN

1/F PLAN

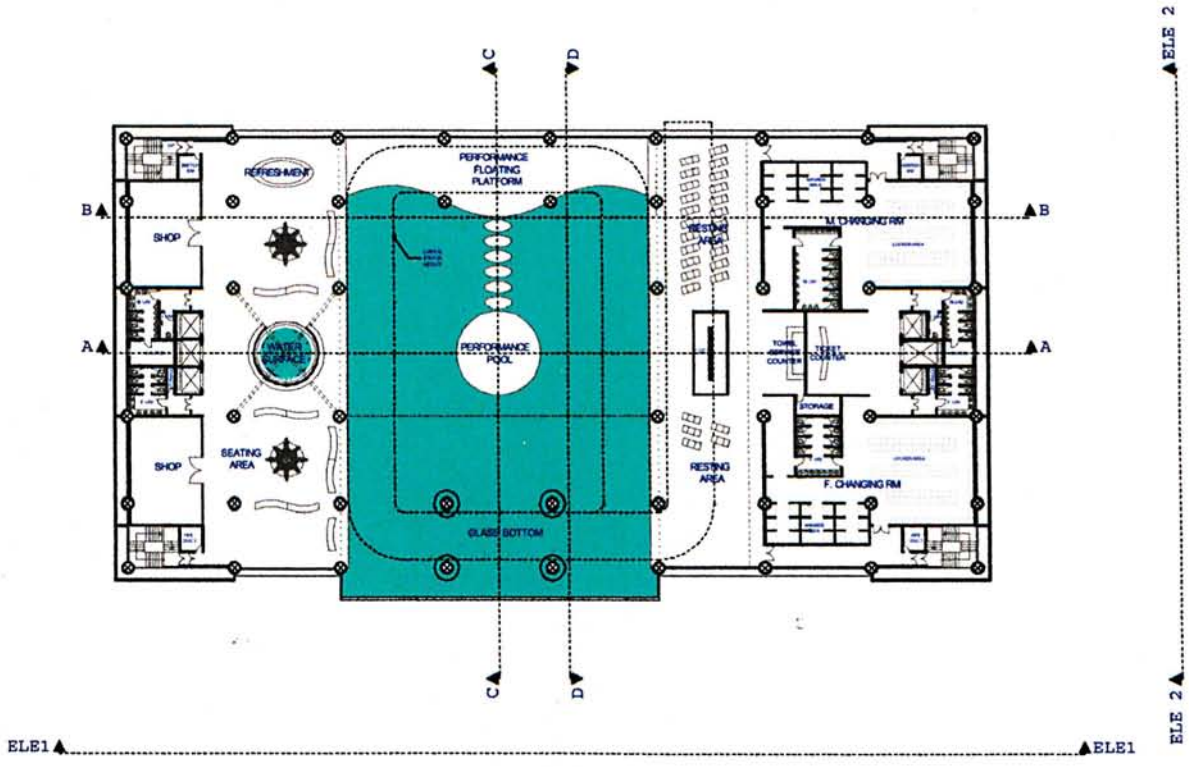


2. MECH. FLOOR PLAN

2/F PLAN

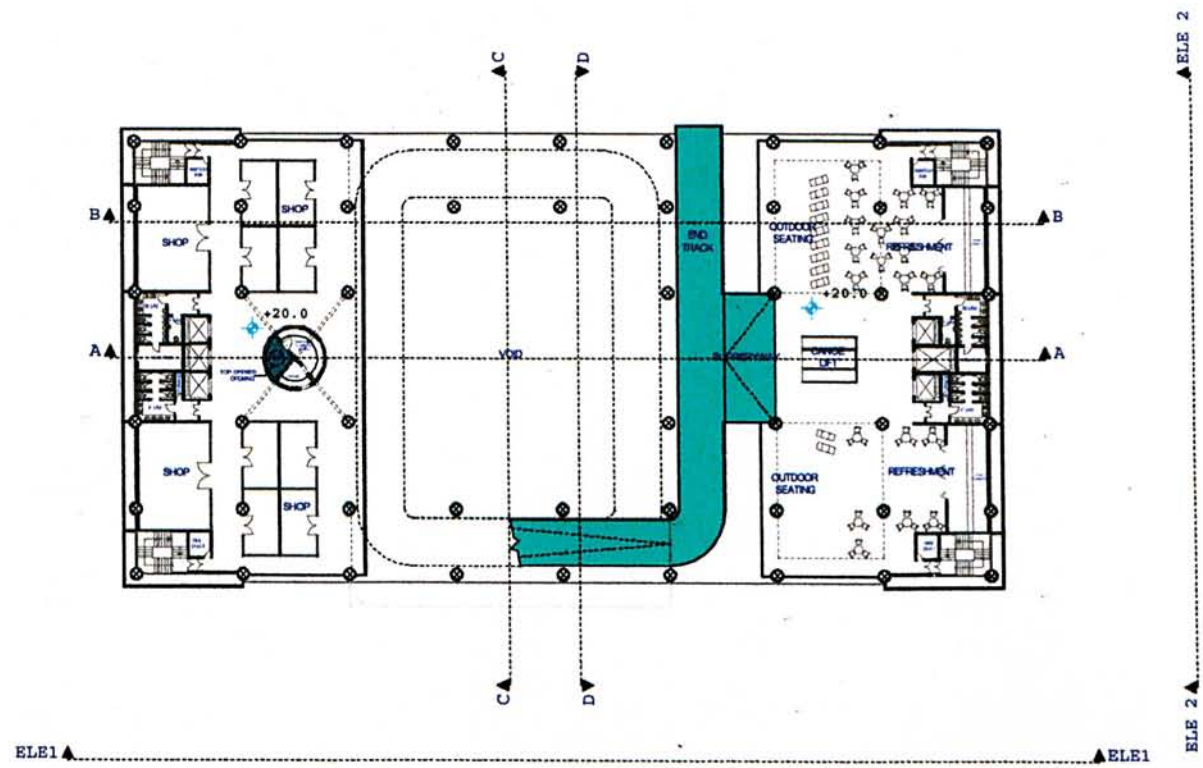
10. Final Design

Floor Plans



3. PERFORMANCE POOL PLAN

3/F PLAN

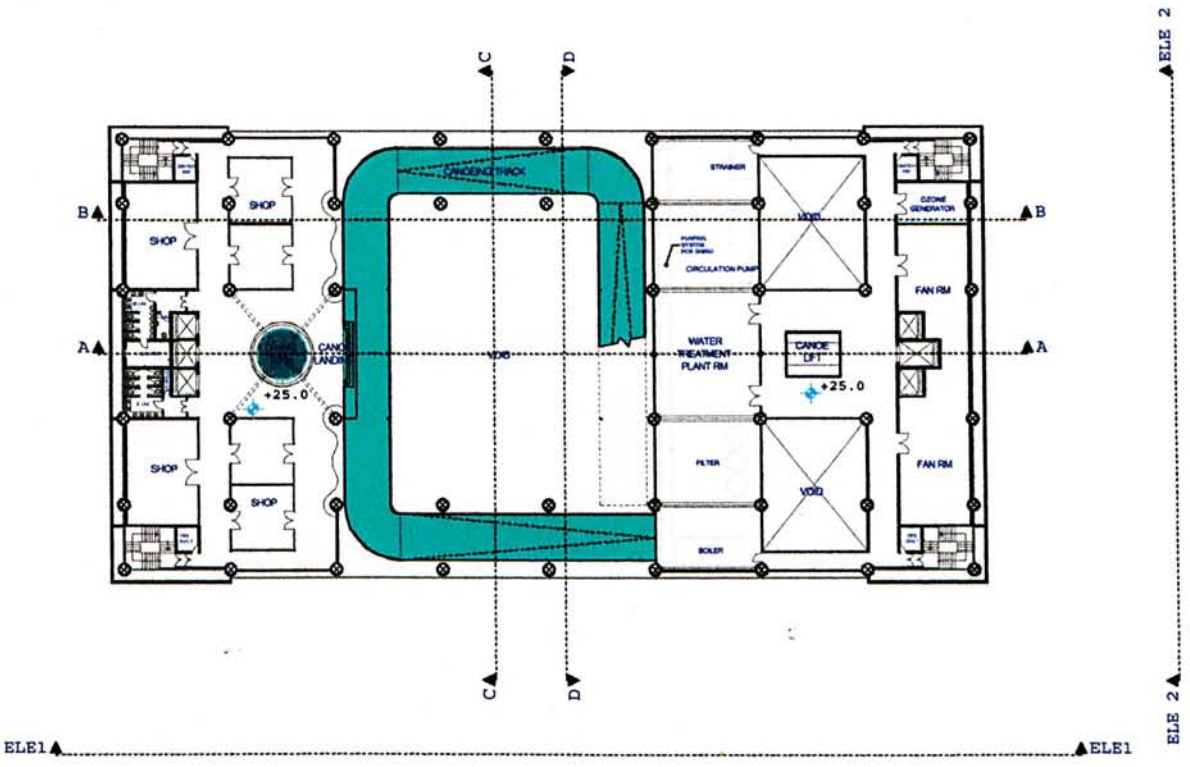


4. SHOPPING + CANOE END PLAN

4/F PLAN

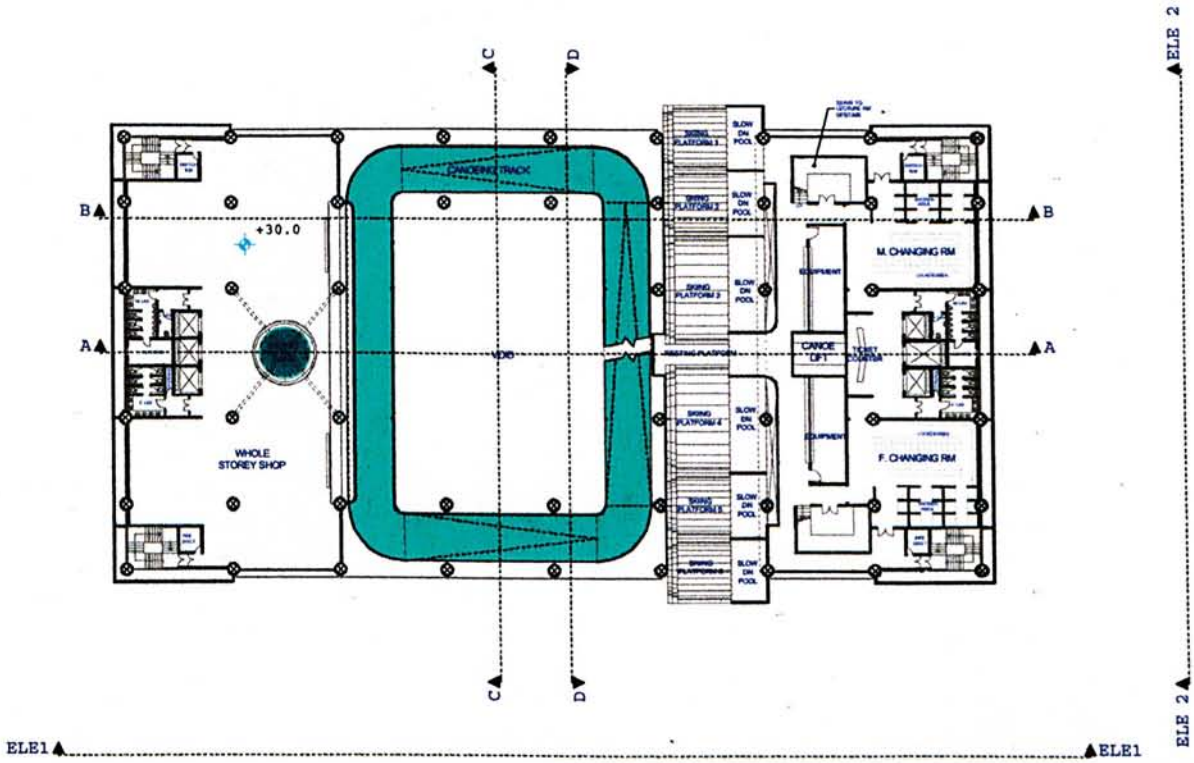
10. Final Design

Floor Plans



5. SHOPPING + MECH PLAN

5/F PLAN

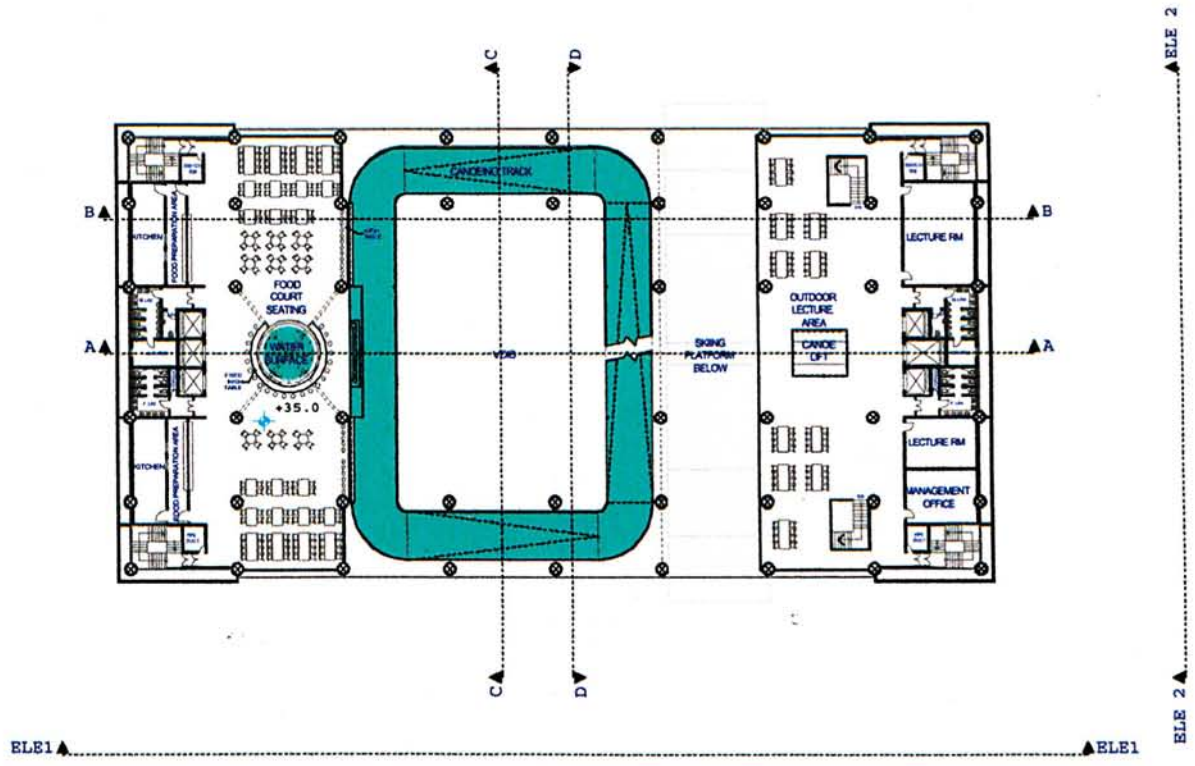


6. SHOPPING + SKIINGPLAN

6/F PLAN

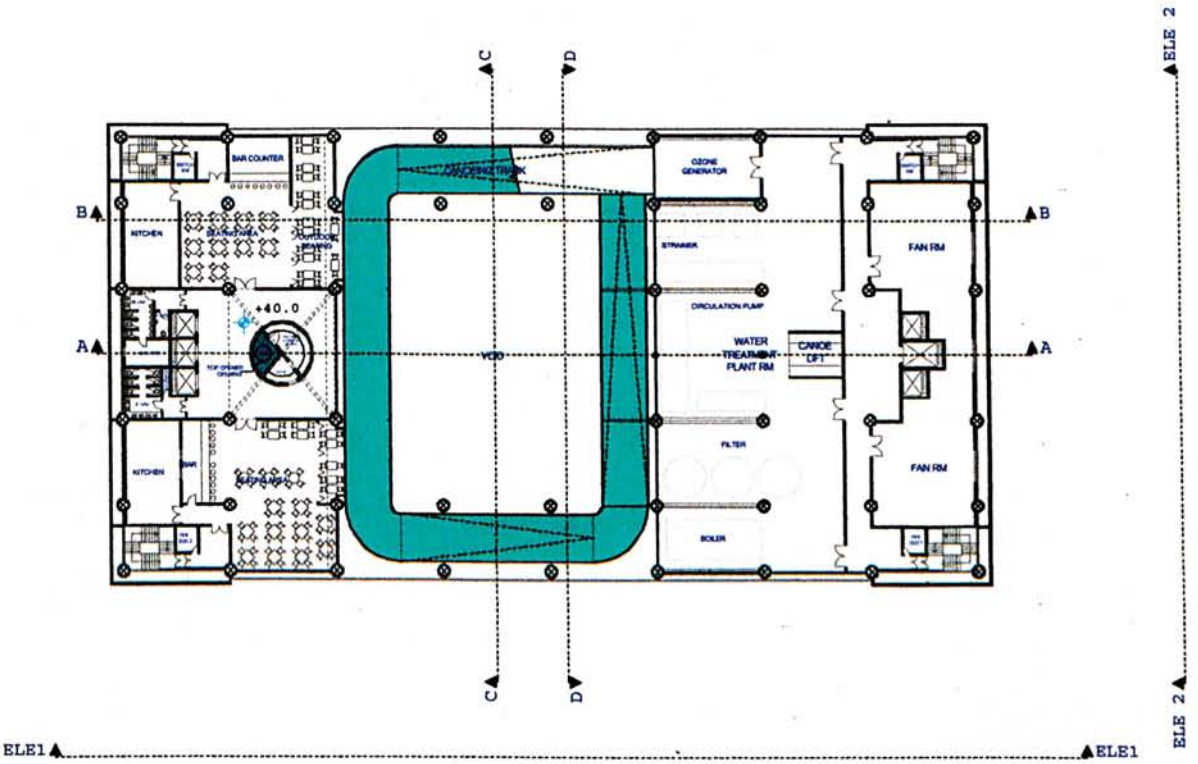
10. Final Design

Floor Plans



7. FOOD COURT + LECTURE RM PLAN

7/F PLAN

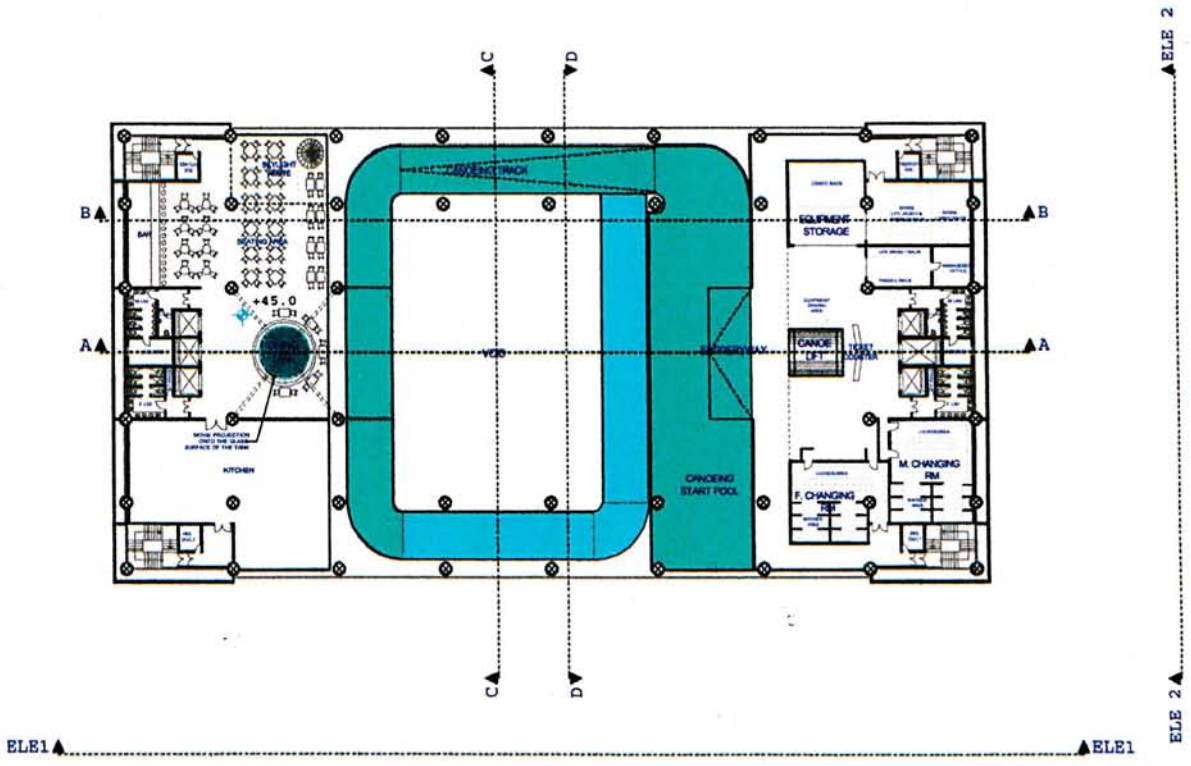


8. RESTAURANT + MECH PLAN

8/F PLAN

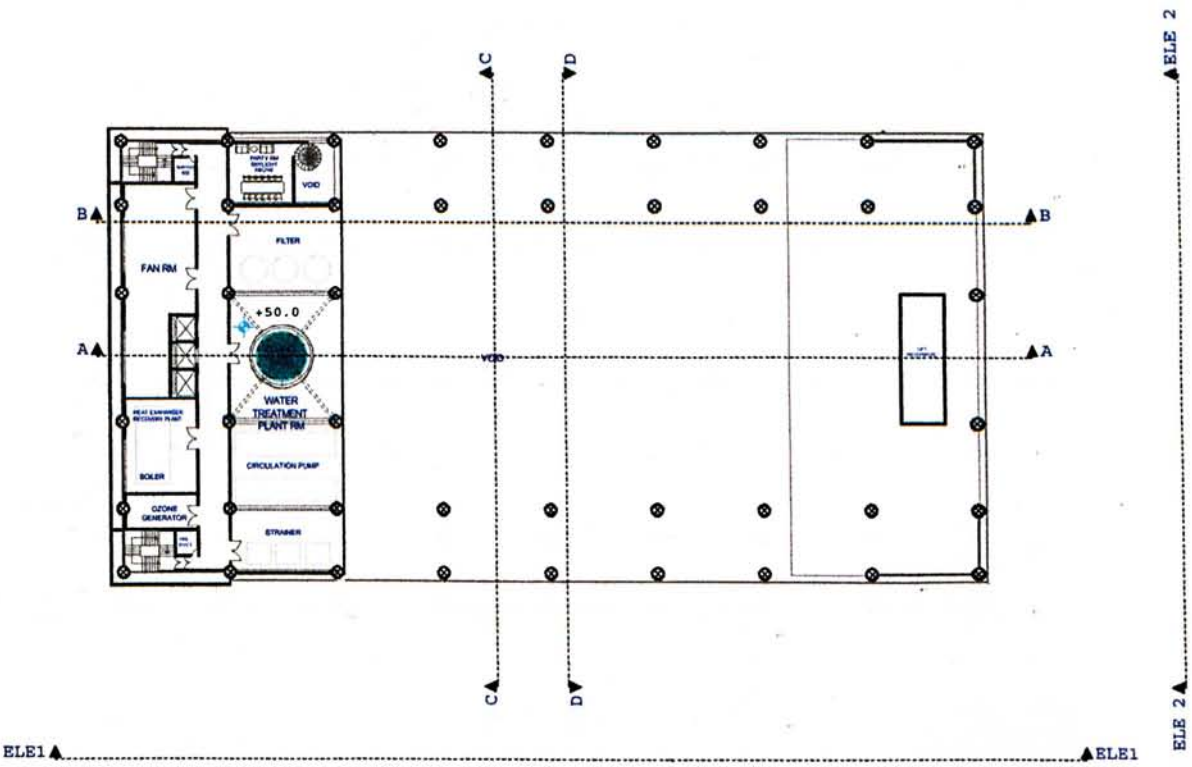
10. Final Design

Floor Plans



9. RESTAURANT + CANOE START PLAN

9/F PLAN

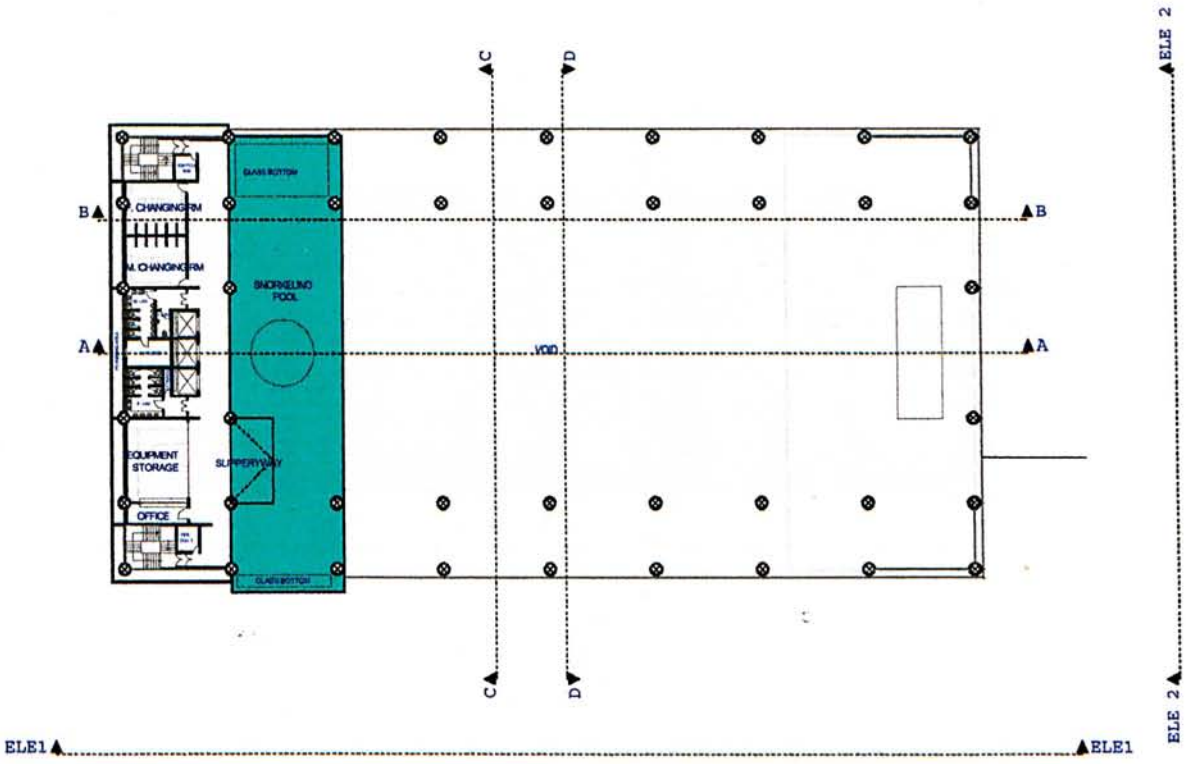


10. MECH. PLAN

10/F PLAN

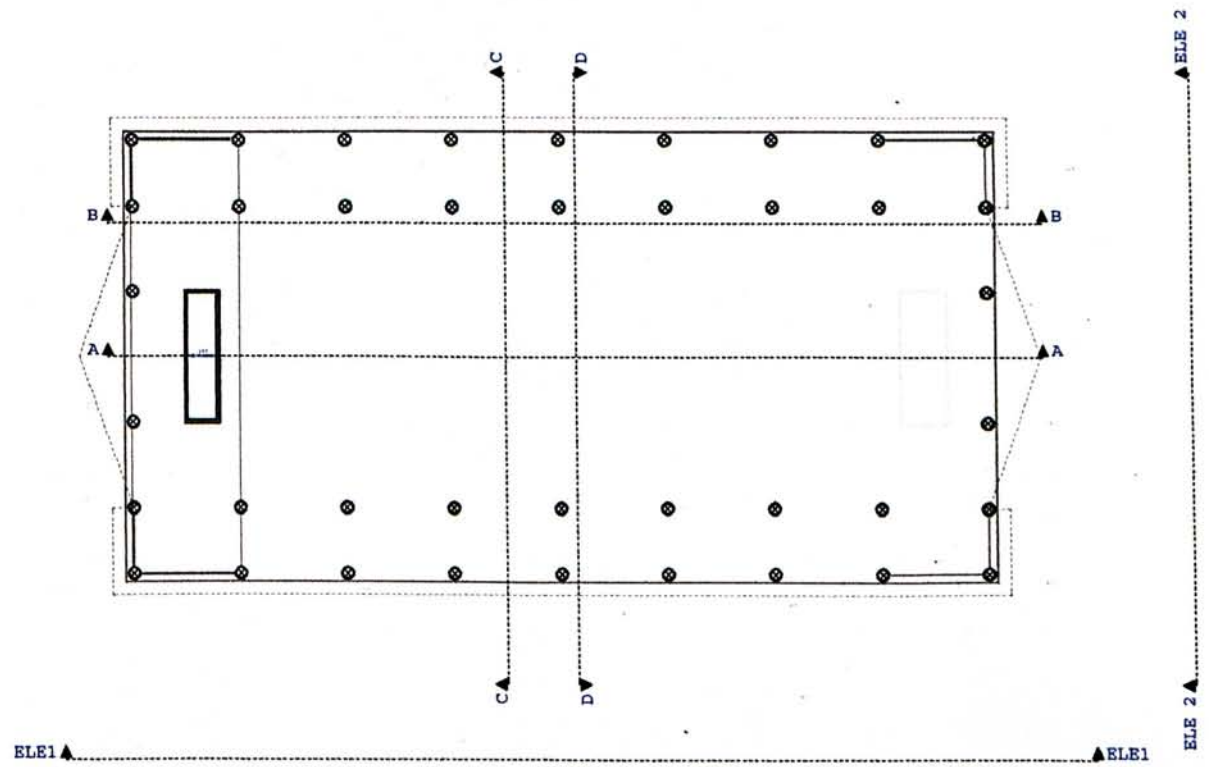
10. Final Design

Floor Plans



11. SNORKELING POOL PLAN

11/F PLAN

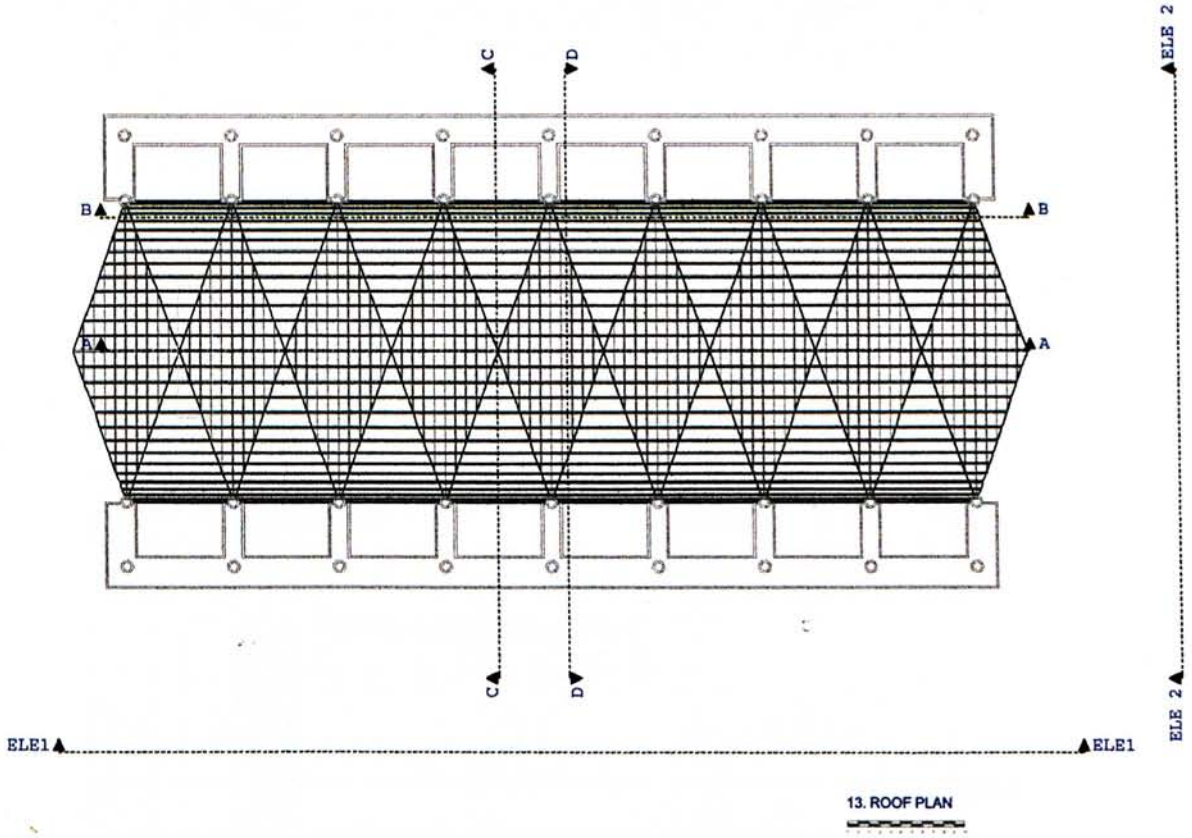


12. TOP PLAN

12/F PLAN

10. Final Design

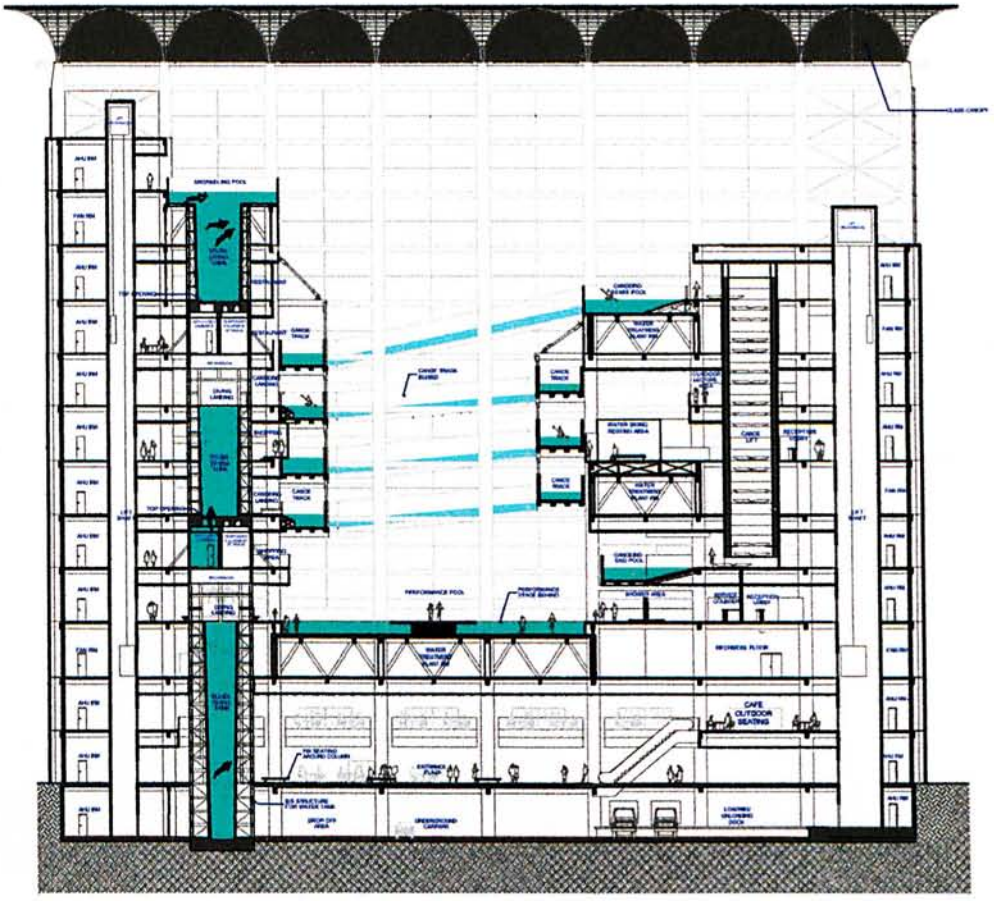
Floor Plans



ROOF PLAN

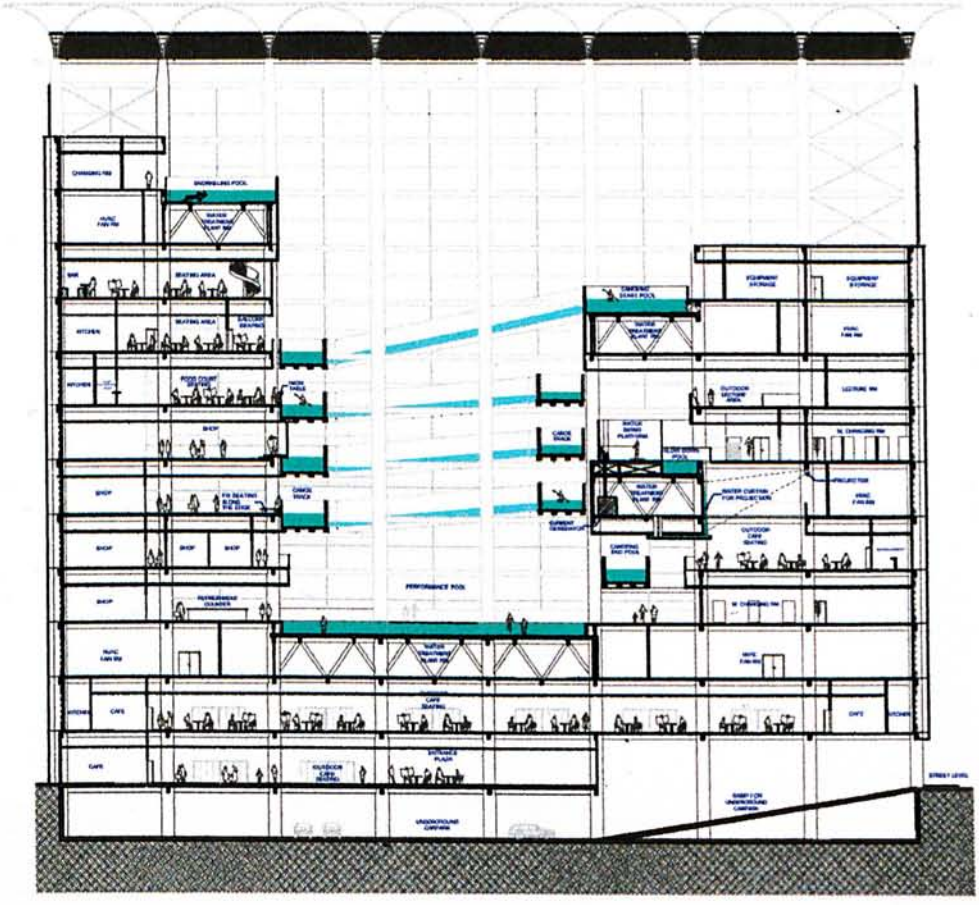
10. Final Design

Sections



SECTION A-A

Section AA

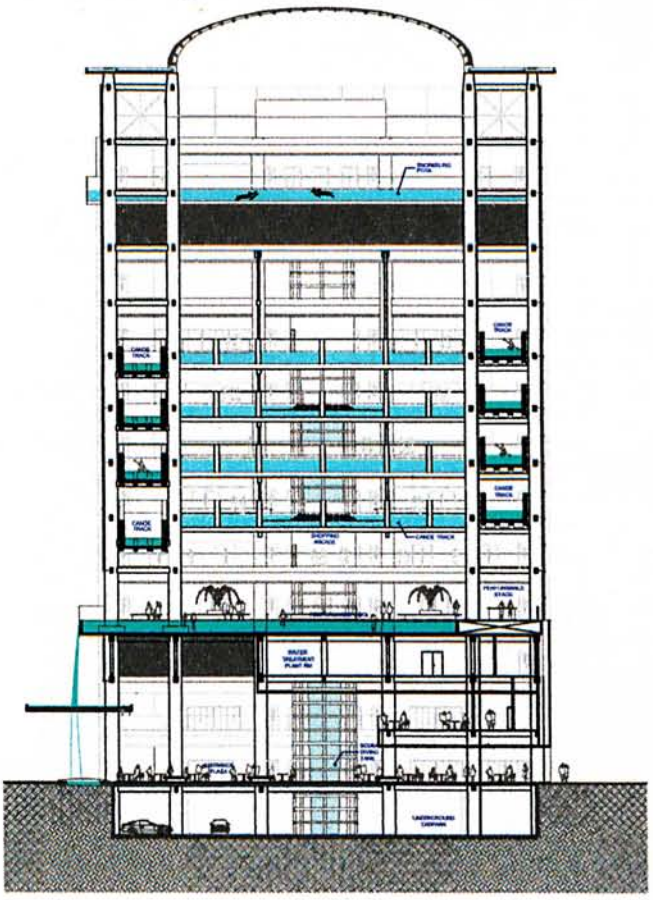


SECTION B-B

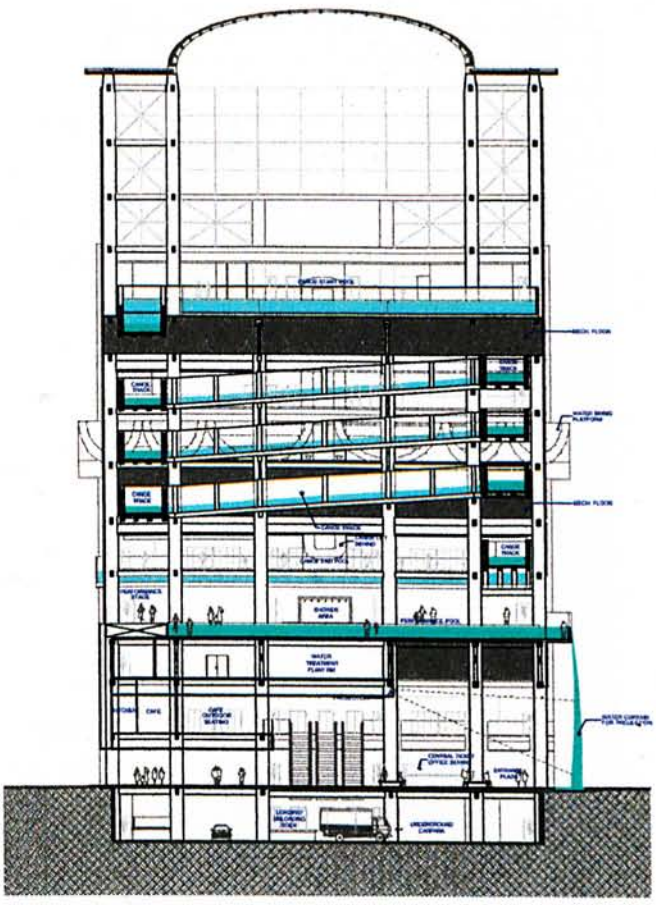
Section BB

10. Final Design

Sections



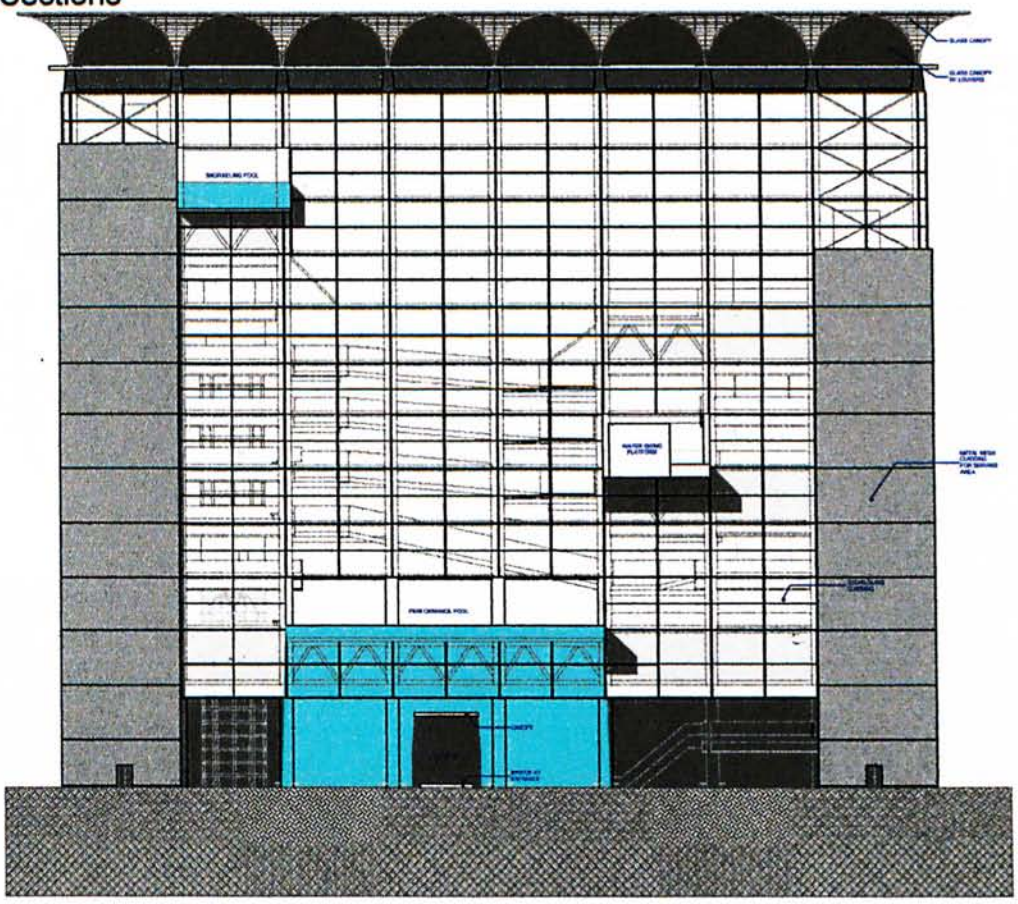
Section CC



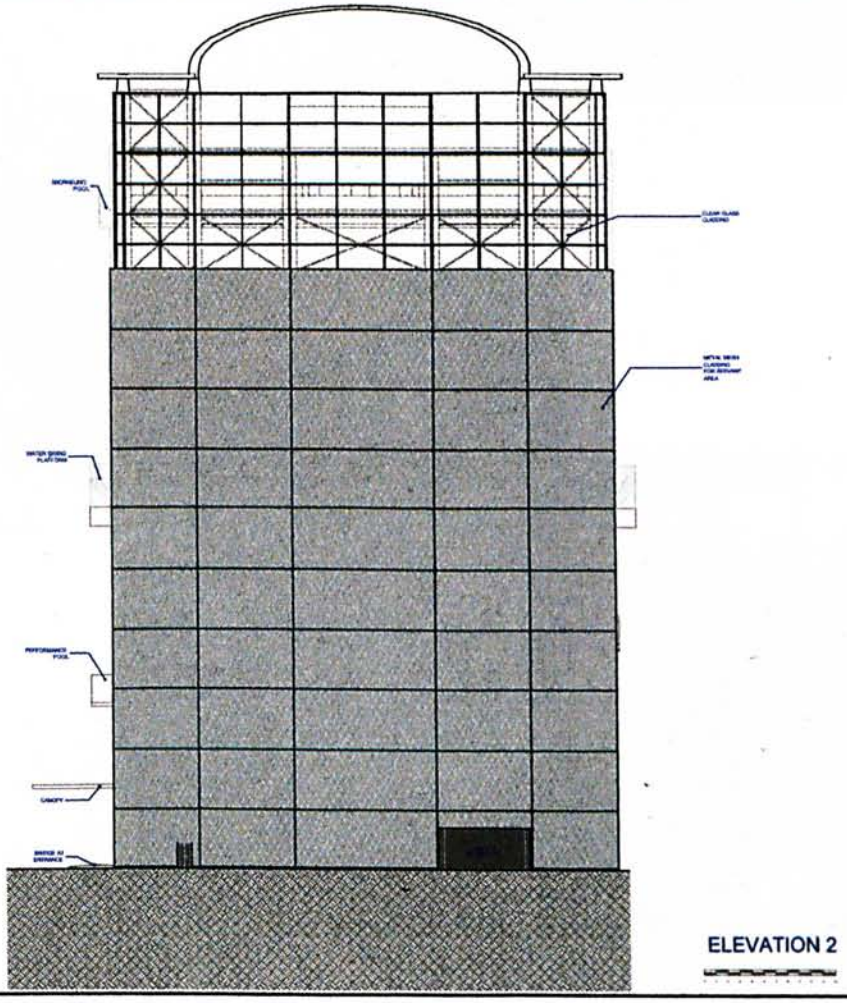
Section DD

10. Final Design

Sections



Elevation 1



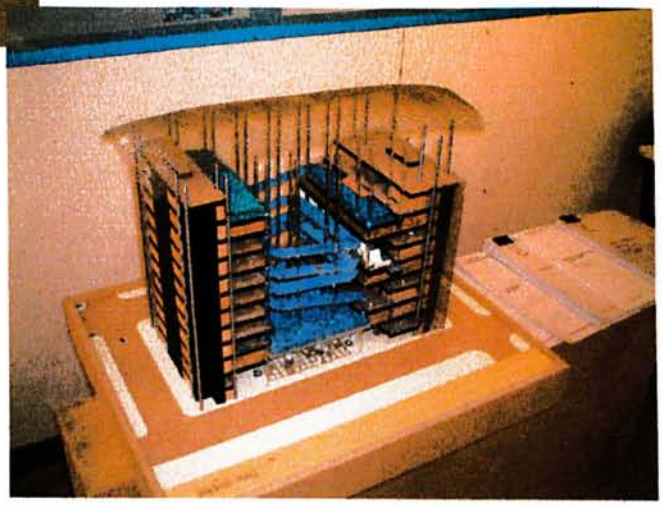
Elevation 2

10. Final Design

Final Product

Pinup in presentation

Site model



Buidling model

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Tammy Tse
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Lau Hok Fu
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